

Exhibit 1



US009763851B2

(12) **United States Patent**
Lenke

(10) **Patent No.:** **US 9,763,851 B2**
(45) **Date of Patent:** **Sep. 19, 2017**

(54) **STIMULATION DEVICE**

(56) **References Cited**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(21) Appl. No.: **15/023,471**

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(22) PCT Filed: **Jul. 22, 2014**

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(86) PCT No.: **PCT/EP2014/065734**

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(2) Date: **Mar. 21, 2016**

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(87) PCT Pub. No.: **WO2015/039787**

(Continued)

PCT Pub. Date: **Mar. 26, 2015**

(65) **Prior Publication Data**

US 2016/0213557 A1 Jul. 28, 2016

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(30) **Foreign Application Priority Data**

Sep. 23, 2013 (DE) 10 2013 110 501

(51) **Int. Cl.**

A61H 19/00 (2006.01)

A61H 9/00 (2006.01)

(52) **U.S. Cl.**

CPC **A61H 19/34** (2013.01); **A61H 9/00** (2013.01); **A61H 9/005** (2013.01); **A61H 9/0007** (2013.01);

(Continued)

(58) **Field of Classification Search**

CPC **A61H 19/00**; **A61H 19/30**; **A61H 19/34**; **A61H 19/32**; **A61H 19/50**; **A61H 7/00**;

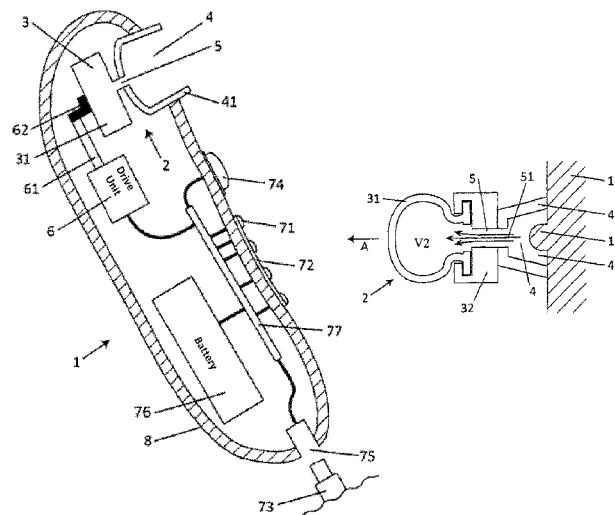
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ABSTRACT

The invention relates to a stimulation device (1) for erogenous zones, in particular for the clitoris (12), which device (1) has at least one pressure field generator (2) with at least a first chamber (3) and at least a second chamber (4) with at least one opening (42) for placing onto a body part (11), and at least one connection element (5) which connects the first chamber (3) to the second chamber (4), and with a drive unit (6) which changes the volume of the first chamber (3) in such a way that, by way of the connection element (5), a pressure field is generated in the second chamber (4) and serves for stimulation; and a control device (7) which controls the drive unit (6).

8 Claims, 7 Drawing Sheets



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(52) U.S. Cl.

CPC *A61H 9/0057* (2013.01); *A61H 19/00* (2013.01); *A61H 19/30* (2013.01); *A61H 2201/0157* (2013.01); *A61H 2201/1207* (2013.01); *A61H 2201/1238* (2013.01); *A61H 2201/1409* (2013.01)

(58) Field of Classification Search

CPC *A61H 7/008*; *A61H 7/003*; *A61H 7/004*; *A61H 9/00*; *A61H 9/0007*; *A61H 9/005*; *A61H 9/0057*; *A61H 2009/0064*; *A61H 9/0071*; *A61H 2201/0153*; *A61H 2201/0157*; *A61H 2201/12*; *A61H 2201/1207*; *A61H 2201/1238*; *A61H 2201/1409*; *A61H 2201/1418*; *A61H 2205/087*; *A61H 2201/5097*
USPC 601/6, 9; 600/38
See application file for complete search history.

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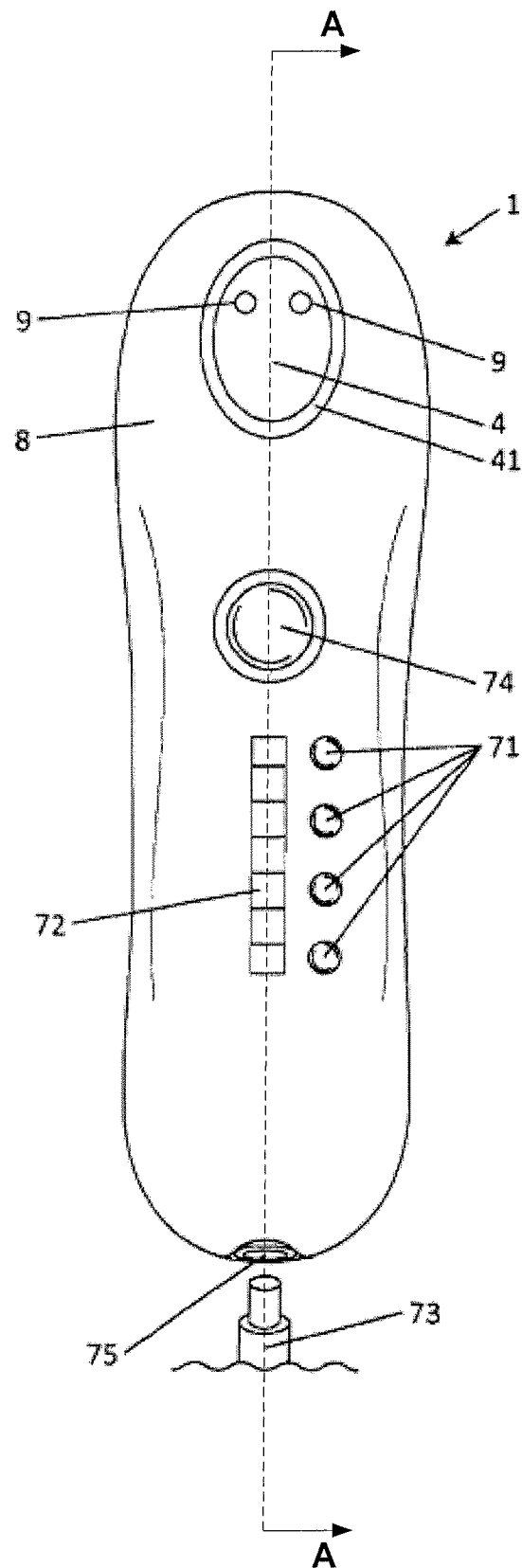
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Fig. 1



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Fig. 2

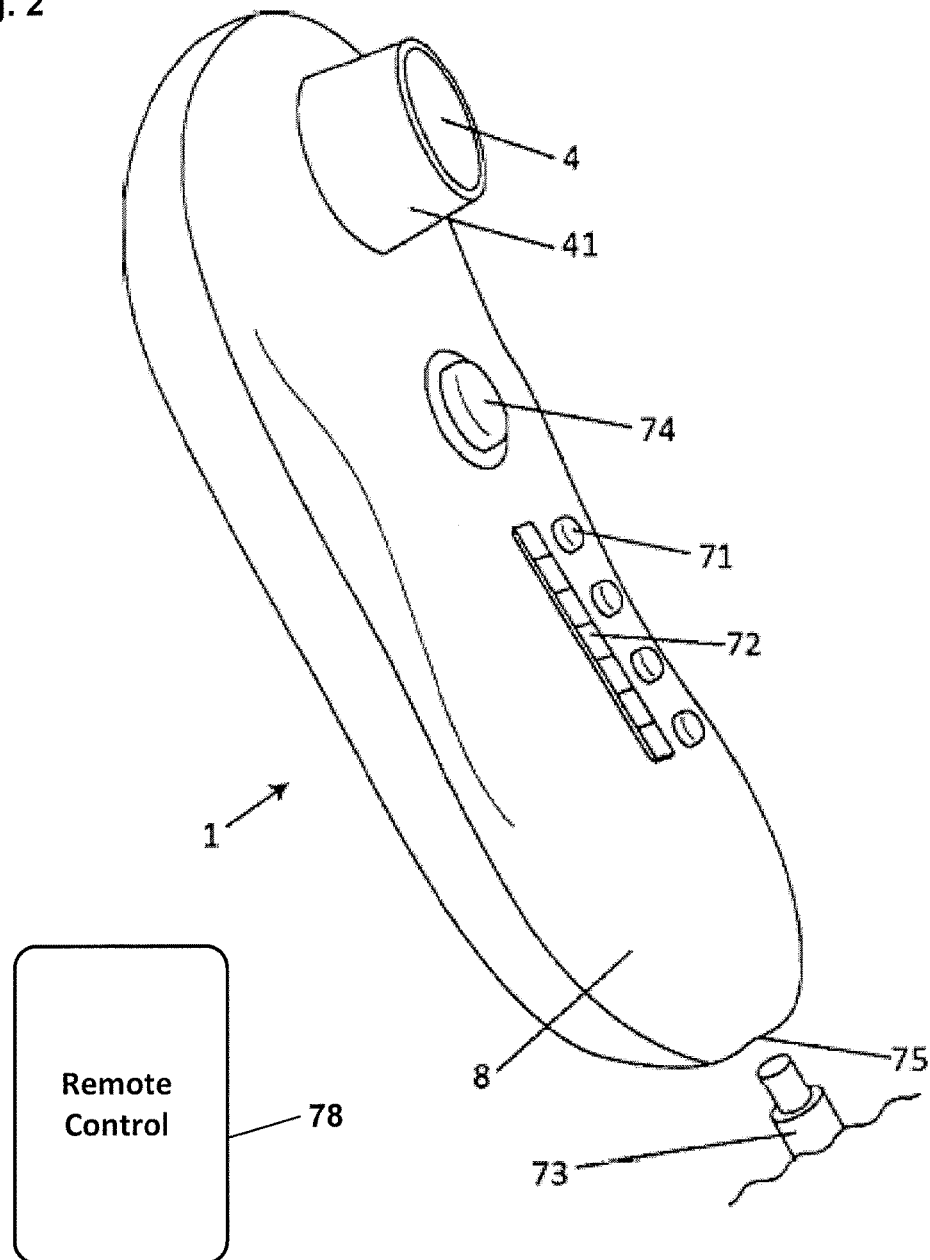


Fig. 3

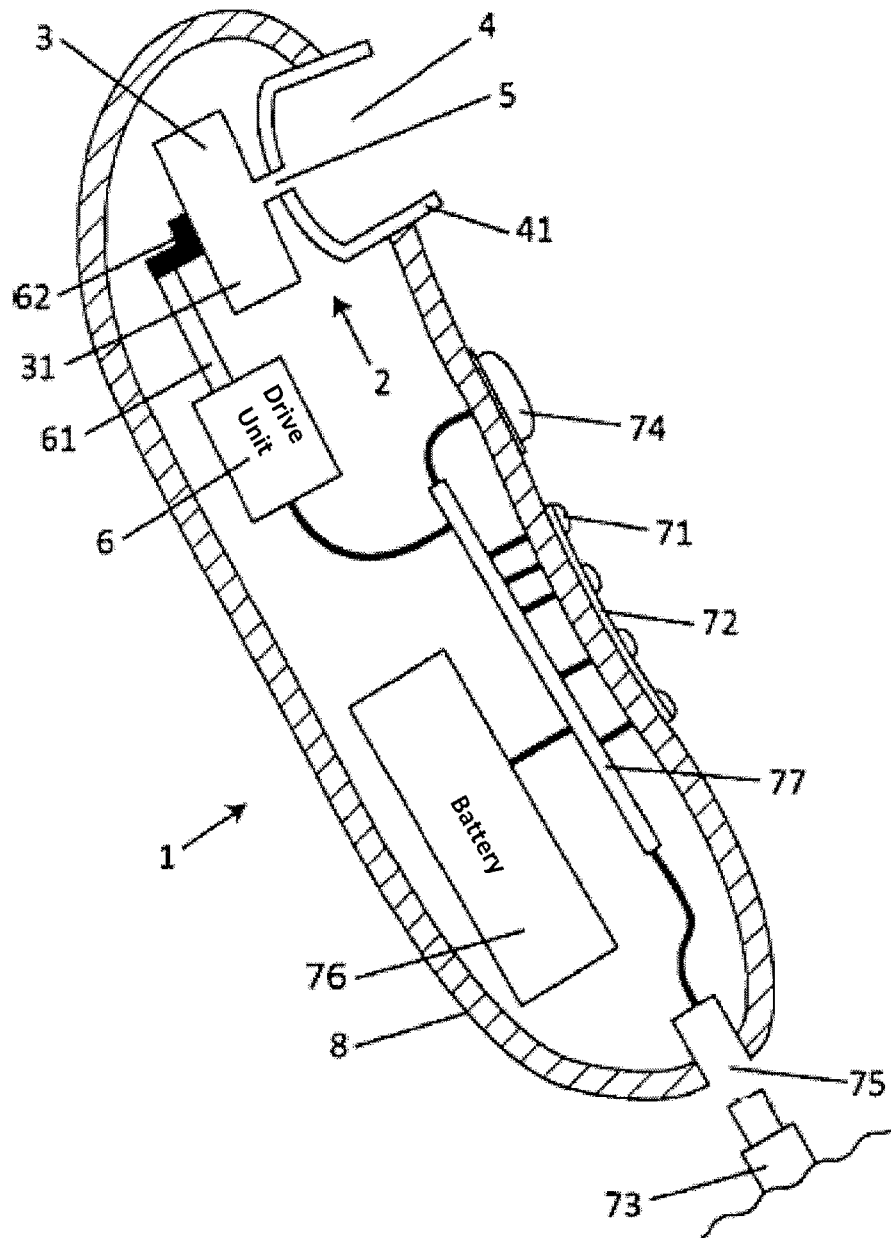


Fig. 4

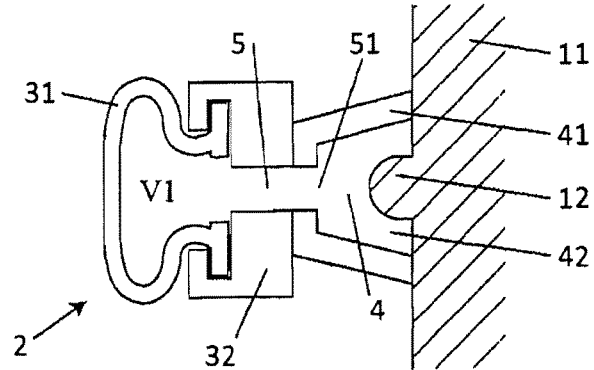


Fig. 5

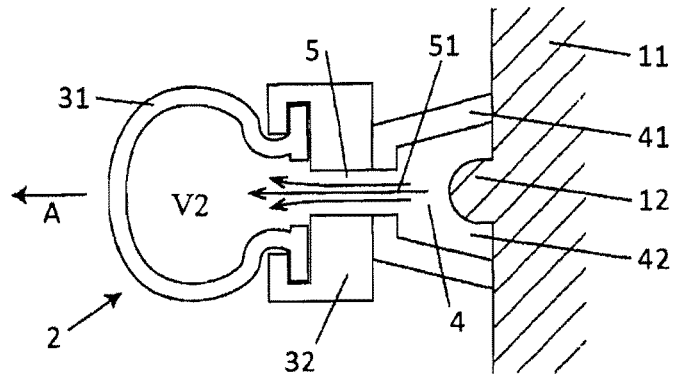


Fig. 6

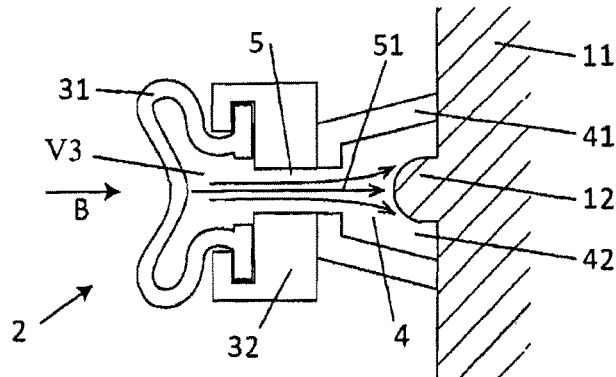


Fig. 7

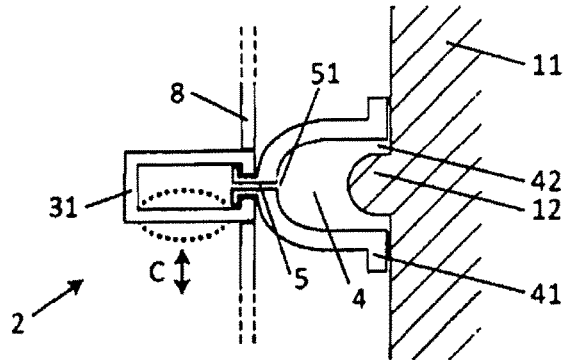


Fig. 8

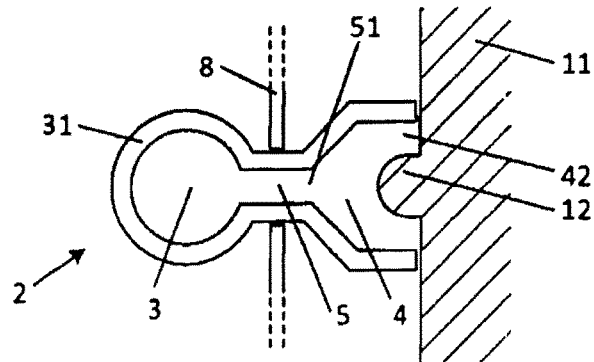


Fig. 9

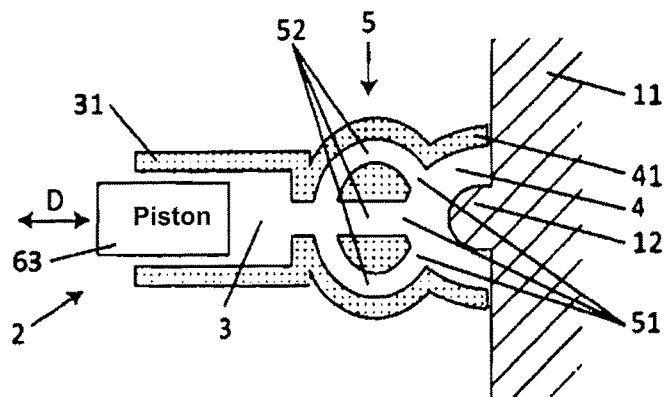


Fig. 10a

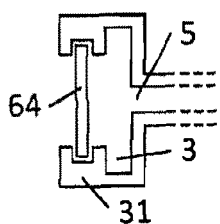


Fig. 10b

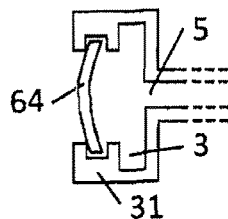


Fig. 10c

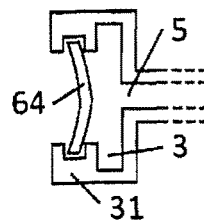


Fig. 11

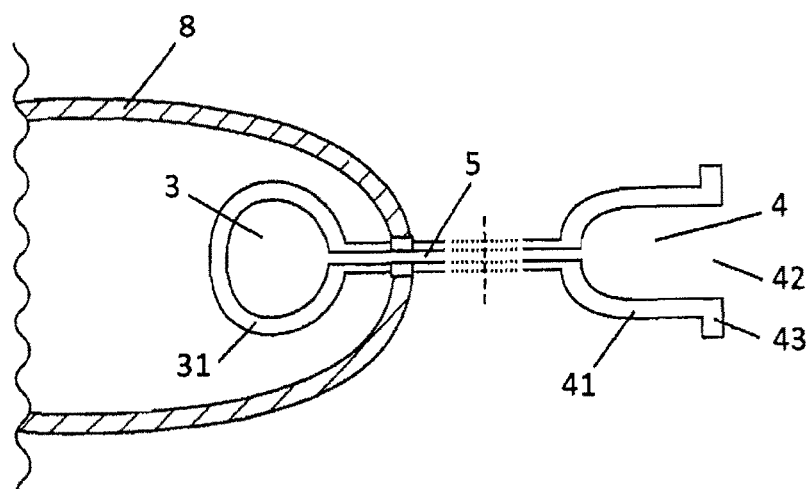


Fig. 12a

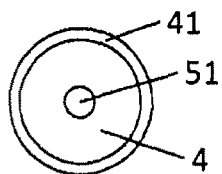


Fig. 12b

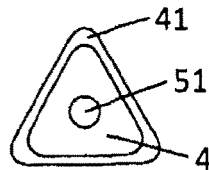


Fig. 12c

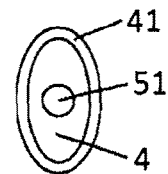


Fig. 12d

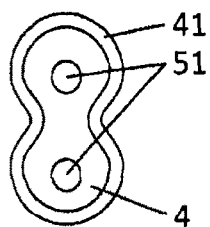


Fig. 12e

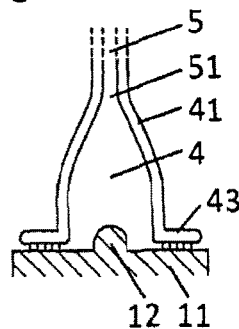


Fig. 12f

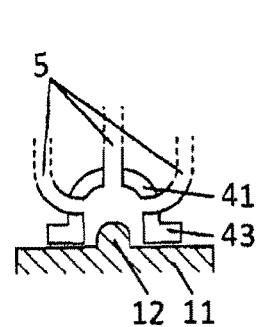


Fig. 13

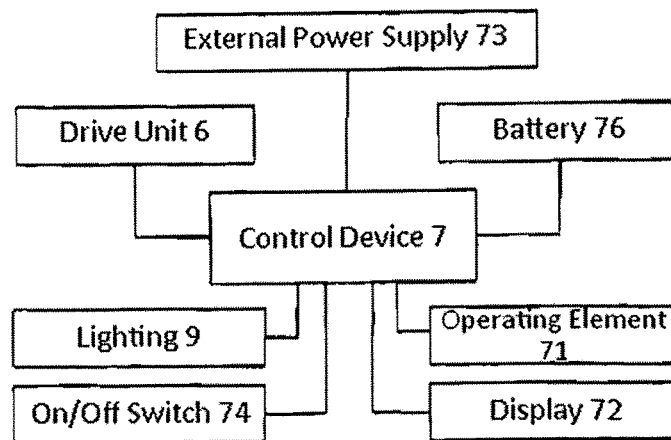


Fig. 14a

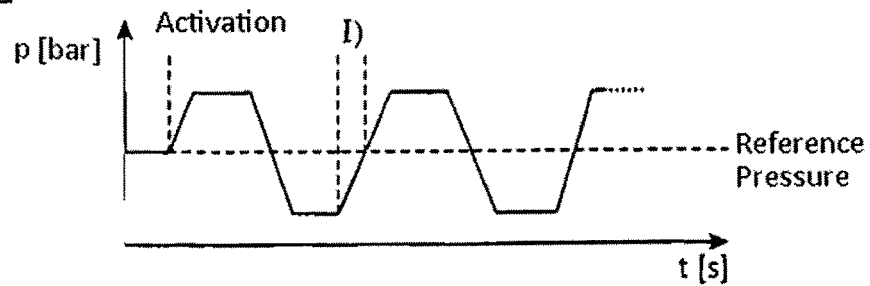


Fig. 14b

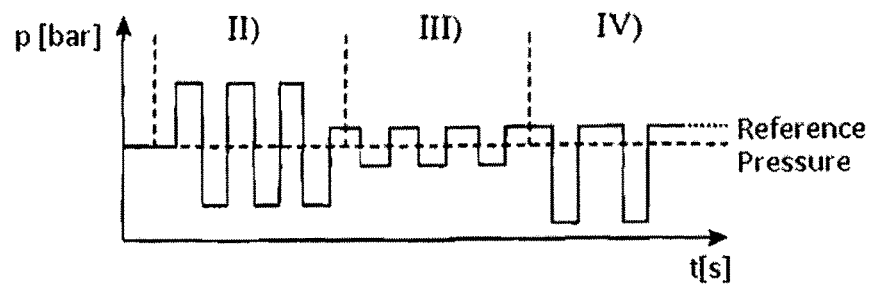
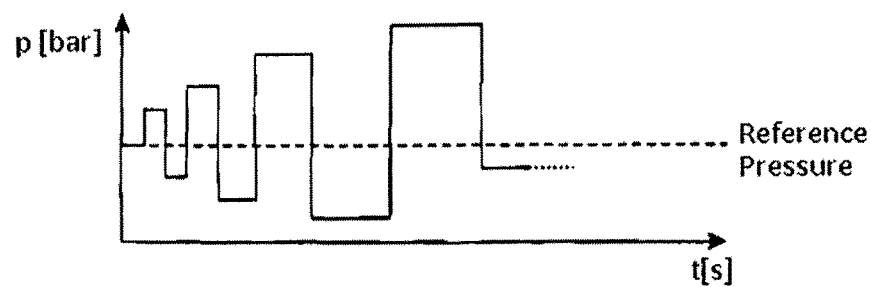


Fig. 14c



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STIMULATION DEVICE**CROSS-REFERENCE TO RELATED APPLICATIONS**

This application is a national stage (under 35 U.S.C. 371) of International Patent Application No. PCT/EP2014/065734, filed Jul. 22, 2014, which claims priority to German Patent Application No. 102013110501.7, filed Sep. 23, 2013, both of which are herein incorporated by reference in their entirety.

The present invention relates to a stimulation device for erogenous zones, in particular for the clitoris, a system with a stimulation device, as well as to methods for stimulating body parts.

The erogenous zones of the human body can be stimulated with a variety of tools. For example, vibrators are used to apply a stimulus to a particular area of the skin by direct contact. However, this form of stimulation can lead to irritations or inflammations of the skin. Also, direct contact of the genital area with such tools for individual reasons of hygiene or due to personal reservations, for example, may not be desired.

In particular, the direct stimulation of the clitoris with a clitoral massage vibrator, for example, is fraught with problems, as the clitoris is usually a woman's most sensitive erogenous zone. The entire clitoris is equipped with numerous nerve endings, thus making it particularly touch-sensitive and responsive to sexual stimuli. Here, the clitoris glans, in which the nerve cords of the two thighs meet, should be particularly emphasized. Frequent use of a clitoral massage vibrator for direct stimulation, for example, leads to habituation effects or conditioning of the stimulated erogenous zone and the initial use of such a device may require certain practice or familiarization.

Furthermore, medical studies conducted in 2006 determined the female clitoris as definitive starting point of the female climax and neurologically proved the different qualities of sensation of clitoral (and vaginal) orgasm for the first time. Thus, according to the most recent medical research, the stimulation of the clitoris, rather than the vagina, is considered the starting point of a woman's sexual arousal and thereby the key to female "sexual pleasure".

The sensitivity of the human erogenous zones, such as the clitoris, the inner and outer labia or the nipples, continues to differ greatly individually. The person may be so sensitive that direct stimulation is only possible after prolonged foreplay, and even then only very subtly or ruled out completely. Furthermore, the sensitivity of the corresponding zone can change dramatically from one situation to another or even during a sexual act.

For the aforementioned reasons, various indirect forms of stimulation are common practice as alternatives to direct stimulation.

For indirect stimulation of erogenous zones, and especially the clitoris, conventional vacuum devices are used to arouse the erogenous zones of the person concerned without directly contacting the main area to be stimulated. Thus, for example, vacuum pumps for the primary or secondary female sexual organs are known, which usually have a suction cup for placing on the appropriate area and a hand pump. The negative-pressure exerted by this type of device on the clitoris, for example, generates a negative pressure in the clitoris itself, which is usually lower than the systolic blood pressure. This difference in pressure leads to an enlargement of the clitoris and/or stimulates the blood flow in the affected area. This vascular clitoral engorgement

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serves both to promote desire by increasing sensitivity and for optical and tactile manipulation. The improved blood circulation also leads to an increased leakage of vaginal moisture which makes the stimulation more pleasurable.

However, the manual operation of the hand pump is often annoying or distracting. In addition, the long-term or uninterrupted use of negative-pressure in this device category may lead to habituation effects, which limit the effectiveness of the device in the long run. Moreover, a pure increase in the clitoral blood flow is often insufficient to reach a climax; vacuum pumps are thus often used only as foreplay to achieve the climax with a subsequent direct (pressure) massage of the erogenous zone.

Electrically driven vacuum pumps are also used increasingly instead of manually operated vacuum pumps as well. As an example of this, WO 2006/05 82 91 A2 discloses a device for sexual therapy, wherein the arrangement consists of a tubular suction chamber for the clitoris, an electric vacuum source (vacuum pump) and a plurality of airflow openings. The operation of the vacuum pump generates a permanent airflow or air exchange in the chamber in the area of the clitoris. This has the disadvantageous effect of suctioning the increasingly leaking vaginal moisture caused by the negative-pressure, thus having a drying effect on the stimulated parts of skin. Likewise, the suctioned moist air leads to a contamination of the fluidic subsequent vacuum arrangement, of the vacuum pump for example. Such arrangements with vacuum pumps may thus be hygienically problematic, as vacuum pumps and the associated valves or ventilation components often have dead spaces or blind spots and/or are difficult to clean. Furthermore, the device is meant to treat the blood vessels in the clitoris and not to provide stimulation up to sexual climax.

U.S. Pat. No. 6,099,463 A discloses a clitoris stimulation device with a tubular suction chamber, a vacuum source or a vacuum pump and a plurality of valves, which are used to control the size of the vacuum. The vacuum can also be in cyclic form to achieve a stimulation effect, although habituation effects are also to be expected with this device due to the use of a permanent vacuum. As explained above, the disadvantages relating to hygiene and the dehydration of the skin part to be stimulated are also present here. Likewise, the pressure-related arrangement with a plurality of valves, vacuum pump, etc. is relatively complex.

U.S. Pat. No. 6,464,653 B1 discloses therapeutic devices and methods to generate a clitoral engorgement with the aid of a vacuum generated by a vacuum pump to assist in the treatment of clitoral disorders, such as incontinence. A control valve or modulator that can be correspondingly covered by a finger is used to manually adjust or vary the amount of vacuum in the suction chamber. This requires the user's attention and may be distracting or diverting under certain circumstances. This relatively complex device with additional valves also has the same disadvantages relating to hygiene and dehydration as explained above, although the device is also used for long-term therapeutic purposes and not for short-term sexual stimulation.

WO 2008/02 80 76 A2 discloses a therapeutic device for women, which is mainly dedicated to treating sexual disorders. The device includes a combination of indirect stimulation by means of a vacuum chamber and direct stimulation by means of mechanical vibrators and oscillators.

The negative-pressure in this therapeutic device is used to increase the blood flow in the clitoris, while the area of skin is actually stimulated or massaged by means of direct mechanical vibrations/oscillations. Thus, a suction cup for placing on the area of skin to be stimulated is internally

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connected with a motor via a mechanical connection. The suction cup is extended by the motor once the device is activated, thus increasing the volume of the suction cup. The resulting volume of the suction cup and thus the strength of the vacuum can be adjusted by means of control elements on the device. The air displaced in the device by the suction process is discharged outwardly again via a pipe. The vacuum in this device has only a supporting function, while the actual stimulation ensues directly, which also entails the same disadvantages of a direct stimulation as explained above.

US 2013/001 276 9 A1 discloses a device in which a pulsating positive-pressure is used for stimulating an air pressure massage. A pump or compressor thus generates a pulsating positive-pressure, which is directed towards the erogenous zone to be stimulated by means of a nozzle. This device disadvantageously causes the affected area of skin to dry out severely or completely. Likewise, there is usually a temperature difference between the temperature of the supplied air and the temperature of the area of skin to be stimulated, which may be felt to be distracting under certain circumstances. The same problems of hygiene as explained above also occur in this device, although in this case any pathogens or germs or other contaminations located in the device are also transported directly to the user's genital area.

Thus, the prior art devices all have the same disadvantage in common, in that the complexity of the arrangements generating negative-pressure or positive-pressure may be high and this device may have problems of hygiene.

Furthermore, the prior art devices have another disadvantage in common, in that habituation effects occur in the event of constant or frequently recurring use of negative-pressures.

Another disadvantage of some of the previously described vacuum devices is, firstly, that the negative-pressure has to be limited by means of a control valve or a vacuum pump and, secondly, that the negative-pressure is supposed to be reduced by means of a manual opening of a release valve, before the suction cup is peeled from the skin. Should one of the valves have a technical defect and/or the user operate the device incorrectly, there may be a risk of injury in certain circumstances.

Thus, in view of the problems as explained above, the problem addressed by the invention is to provide a stimulation device with a simple construction that is easy and safe to use.

Another problem addressed by the present invention is to provide a stimulation device with an effective stimulation-triggering effect, which is suitable for stimulating an erogenous zone, especially the female clitoris.

In addition, partial problems addressed by the invention are to provide a device, which prevents the erogenous zones to be stimulated from drying out, is hygienic and prevents habituation effects.

The problem addressed by the invention is solved by the stimulation device described herein. Advantageous developments and embodiments are also described herein.

According to the invention, a pressure field generator in the stimulation device has at least one first chamber and at least one second chamber with at least one opening for placing on a body part or on the erogenous zone and at least one connection element that connects the first chamber with the second chamber.

This embodiment of chambers according to the invention communicating in a fluidic manner via at least one connection element allows the first chamber to simply generate a pressure field in the second chamber by modifying the

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volume in the first chamber, which is occasionally directed at the area of skin to be stimulated.

A pressure field in terms of the invention is a temporally modifiable field of media pressures, with occasional positive-pressures and occasional negative-pressures, a negative-pressure being a media pressure below the reference pressure and a positive-pressure being a media pressure above the reference pressure.

The medium is usually gaseous, preferably air, but may alternatively or additively, for example, be a liquid medium, such as water or commercially available lubricant. For example, the chambers according to the invention may be filled with the lubricant prior to using the stimulation device. This allows the corresponding area of skin to be stimulated with a suitable skin-friendly liquid in lieu of air as well, whatever the user's individual preference. As another example, the stimulation device may also be used under water with water as the medium (in the bathtub, for example).

The reference pressure is usually the existing ambient pressure in relation to the stimulation device at the beginning of use (i.e. prior to placing the stimulation device on the area of skin to be stimulated). In the preferred use of the stimulation device with air, the reference pressure is the currently existing air pressure or normal pressure.

The pressure field according to the invention excites the blood circulation of the area of skin to be stimulated, while said area of skin is indirectly massaged, thus combining two advantageous effects. The increased blood circulation makes the erogenous zone of the person concerned more sensitive, while generating an additional massage effect that serves, for example, to stimulate the erogenous zone to sexual arousal up to climax. The massage effect is generated by the kinetic energy of the medium flowing out of the first chamber through the connection element against the surface of the area of skin to be stimulated. The massage effect generated in this way is indirect, i.e. without the area of skin to be stimulated being contacted by a solid body, such as a vibrator, which results in the avoidance of the initially explained disadvantages of direct stimulation.

By the exemplary use of the temporally modifiable pressure field according to the invention on the clitoris, the pressure field imitates a stimulation that usually only occurs during sexual intercourse. Likewise, the cohabitation movement generates a varying stimulus on the clitoris. It is thus a true-to-life imitation of the natural act of cohabitation, with medical statements confirming that the use of the pressure field according to the invention causes neither habituation effects nor addiction. This is due in particular to the alternating use of negative- and positive-pressures (or even to the non-continuous use of only one type of pressure).

Furthermore, the maximum applicable pressure is regularly limited by the maximum resilience of the area of skin to be stimulated. Thus, for instance, too high a negative-pressure harbors the risk of painful injury, especially in erogenous zones. Only stimulation devices working with negative-pressures are usually limited to this maximum in their mode of operation. Conversely, the combination of positive- and negative-pressures according to the invention creates an extended working area of the stimulation-triggering pressure field or effect, as the working area of the pressure can now be exploited to the maximum in both the positive and negative area.

The orientation of the at least one connection element towards the area of skin to be stimulated allows the pressure field to work directly, wherein the pressure field is decisively influenced by the configuration of the at least one connection

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element and of the at least one opening from the connection element into the second chamber, and is thus adjustable after every use of the stimulation device. Thus, for example, the at least one opening of the connection element may be located opposite and preferably directly opposite the body part to be stimulated. For example, the connection element in a stimulation device intended for the clitoris may have a single passageway with nozzle effect on the clitoris glans between the first and second chamber. Alternatively, the at least one connection element may consist of a plurality, for example four, of passageways between the chambers, if a larger area of skin is to be stimulated.

Furthermore, after placing the halfway or partially opened second chamber on the area of skin to be stimulated, a self-contained system of media- and airflow is created in the pressure field generator. Thus, for instance, the medium or air is moved decisively backwards and forwards between the chambers, while an interchange with media or with air from outside the system being at least largely avoidable. Thus, the first chamber is preferably connected exclusively with the second chamber via or through the connection element. Thus, no first chamber connections other than those to the second chamber exist; for example, there is no direct first chamber connection to the environment of the device via a pressure valve or via an air discharge channel.

For example, the air temperature in the flow system according to the invention rapidly adjusts to the skin temperature, while the distracting supply of new (possibly cold) air from outside the system is avoided, as may be the case, inter alia, when using vacuum pumps in prior art. Drying effects are also avoided, as very little or no removal of stimulation-promoting fluid, such as bodily fluid, occurs in a closed system.

Furthermore, due to the simple construction, the pressure field generator according to the invention has the advantage of increased hygiene and improved cleanability. The present invention thus avoids valves or pumps/compressors with potential dead spaces and places that cannot be cleaned. The pressure field generator according to the invention is thus easy to clean. For example, the stimulation device can be simply cleaned by filling the first chamber with a cleaning agent and activating the pressure field. Alternatively, the second chamber can be arranged to be replaceable, which also simplifies the cleaning of both chambers. Furthermore, the chambers according to the invention and the connection element of the pressure field generator can be designed in one-piece, wherein the latter consists of a single molded plastic part (e.g. rubber).

In addition, the construction according to the invention avoids complex fluidic elements, such as valves, which leads to a simplification in production.

Furthermore, the stimulation device according to the invention has a drive unit, which modifies the volume in the first chamber in such a way that a pressure field is generated via the connection element in the second chamber that serves to stimulate the erogenous zone, and has a control device that activates the drive unit.

As a matter of principle, the medium transported between the chambers is limited to the maximum volume of the first chamber. In addition, the transported volume can be further constructively limited by the maximum possible volume modification caused by the drive unit.

This means that the maximum positive- or negative-pressure the stimulation device can build up in the second chamber is limited due to the dimensioning of the components of the pressure field generator and of the drive. In particular, the maximum positive- or negative-pressure can

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be limited to degree that minimizes or excludes any risk of injury for the areas of skin to be stimulated. As a result, any conventional safety valve in prior art or any manual intervention in the stimulation process by the user, such as the opening of a release valve, is rendered unnecessary.

Furthermore, the temporal modification of the pressure field or the modification of the pressure field by the control device is automatically controlled to a large extent. Thus, for example, the modulation of the pressure field, such as intensity, chronological sequence or evolvment, can be pre-saved in the control device. As a preference, the temporal modification of the pressure field can have a regular or reoccurring (stimulation) pattern, such as impulses with a stipulated cycle or regularly alternating impulse sequences. This allows the user's interaction with the stimulation device according to the invention to be limited to switching on and off and selecting the stimulation pattern, while the stimulation device automatically executes the preferred stimulation pattern. Thus, according to the invention, the user complexity of the stimulation device is low, especially when compared with conventional (medical) vacuum stimulation devices. Alternatively, or additionally, the simulation pattern of the stimulation device can be individually configured by the user during or before operation.

Another aspect of the invention proposes a system comprising the stimulation device, which has a remote control device arranged separately from the stimulation device, wherein the control device of the stimulation device is remotely controlled by the remote control device. This allows a conventional wireless (via radio for example) or wired remote control to be employed, in order to allow the remote controlled moderation of the stimulation device or the activation thereof by another user.

Another aspect of the invention proposes a method for stimulating body parts, especially the clitoris. The associated advantages effects and impacts are explained in more detail above in relation to the pressure field.

Another aspect of the invention proposes the use of the stimulation device according to the invention as a sex toy for stimulating the female clitoris. As explained at the beginning, the female clitoris is an especially erogenous zone of women, which is why the use according to the invention of an indirect massage combined with a negative-pressure stimulation for this body part to provide stimulation up to orgasm seems particularly advantageous.

The above-described features and functions of the present invention as well as other aspects and features are further described in the following with the aid of a detailed description of preferred embodiments with reference to the enclosed illustrations.

BRIEF DESCRIPTION OF DRAWINGS

The figures show in:

FIG. 1 a front view of a first embodiment of the stimulation device according to the invention;

FIG. 2 a perspective side view of the first embodiment of the stimulation device according to the invention;

FIG. 3 a cross-section through section A-A of the first embodiment of the stimulation device shown in FIG. 1 according to the invention;

FIG. 4 a cross-section through section A-A of a pressure field generator of the stimulation device shown in FIG. 1 according to a first aspect of the present invention in the first state;

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FIG. 5 a cross-section through section A-A of a pressure field generator of the stimulation device shown in FIG. 1 according to a first aspect of the present invention in the second state;

FIG. 6 a cross-section through section A-A of a pressure field generator of the stimulation device shown in FIG. 1 according to a first aspect of the present invention in the third state;

FIG. 7 a cross-section through section A-A of a pressure field generator of the stimulation device shown in FIG. 1 according to a second aspect of the present invention;

FIG. 8 a cross-section through section A-A of a pressure field generator of the stimulation device shown in FIG. 1 according to a third aspect of the present invention;

FIG. 9 a cross-section through section A-A of a pressure field generator of the stimulation device shown in FIG. 1 according to a fourth aspect of the present invention;

FIG. 10a), b) and c) cross-sections through section A-A of a pressure field generator of the stimulation device shown in FIG. 1 according to a fifth aspect of the present invention;

FIG. 11 a partial cross-section through section A-A of a second embodiment of the stimulation device of FIG. 1 according to the invention;

FIG. 12a) to f) various bottom and side views of other aspects of a second chamber of the present invention;

FIG. 13 a block diagram of an embodiment of the present invention;

FIG. 14a) to c) Diagrams of various pressure modulation patterns of the present invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

With reference to FIG. 1, a front view of a first embodiment of stimulation device 1 is explained, wherein FIG. 2 shows a perspective view and FIG. 3 a cross-section of the first embodiment of stimulation device 1 according to the invention.

The first embodiment of stimulation device 1 is a preferably electric or small device, comprising a housing 8, a pressure field generator 2, operating elements 71, a display 72, an on/off switch 74, a socket 75, an optional battery 76 and optional lighting 9.

Housing 8 is preferably designed so ergonomically that it can be held comfortably in one hand and has no sharp or pointed edges. Furthermore, housing 8 may consist of plastic, such as polycarbonate (PC) or acrylonitrile butadiene styrene (ABS). In addition, the gripping areas or even the entire housing may be supplemented by or designed in a haptically advantageous silicone. Housing 8 is preferably designed to be at least water-resistant or splash-proof, for example protection class IP 24.

Operating elements 71 are used to adjust the device operating mode, i.e. to adjust the pressure field modulation pattern. Operating elements 71 can, for example, be designed as at least one pushbutton, as at least one rotary switch, or as at least one touch-sensitive switch. Furthermore, operating elements 71 can produce an optical feedback for activating light emitting diodes (LED) integrated in the center of the switch, for example.

An optional display 72 serves to inform the user of the device status and/or the setting status. Display 72 can for example be configured as a plurality of light diodes or as an LCD display. The displayed information can, for example, be the charge status of an optional battery or the current setting of the modulation pattern.

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On/off switch 74 is used for activating and deactivating stimulation device 1. This on/off switch 74 can, for example, be a pushbutton, which switches stimulation device 1 on or off when held down, or a ratcheting slide switch.

A socket 75 is used to supply the external power of stimulation device 1 via an external plug 73, which is connected to an external power adapter, for example. To ensure stimulation device 1 is splash-proof, a magnetic-inductive transformer may be provided instead of the socket, which allows power to be transmitted to stimulation device 1 without any electroconductive contact. Stimulation device 1 preferably also has a battery, such as a nickel metal hydride battery (NiMH) for wireless operation. Alternatively, a (longer) power supply cable may also be led out of the stimulation device.

Pressure field generator 2 of a first embodiment has a first chamber 3 in the interior of stimulation device 1, a second chamber 4 for placing on a body part 11 to be stimulated, and a connection element 5, which connects the first chamber 3 with the second chamber 4.

A drive unit 6, such as an electric motor, drives the first chamber 3 via an axis 61 and by means of an eccentric 62 (or alternatively by means of a connecting rod) in such a way that the volume of the first chamber 3 is modified according to the rotation of axis 61 of drive unit 6. It is hereby annotated that any drive types causing a deflection in wall 31 of the first chamber 3 for volume modification can basically be used in stimulation device 1. The latter may, for example, occur hydraulically, pneumatically, piezoelectrically, mechanically or electromagnetically. Examples of this are described in more detail later on.

A control device 7 activates drive unit 6, operating elements 71 and display 72. Control device 7 and drive unit 6 are supplied with power by internal battery 76 and/or external power supply 73. Control device 7 of stimulation device 1 may be remotely controlled by remote control device 78.

Optional lighting 9 is provided on or in housing 8. Lighting 9 is preferably used for lighting the interior of the second chamber 4. Lighting 9 can either be switched by the user or automatically activated by activating stimulation device 1. Furthermore, lighting 9 can be composed of energy-saving light diodes. The lighting can, for example, serve as an orientation aid in the dark for the user of stimulation device 1 or as additional optical stimulation.

With reference to FIGS. 4, 5 and 6, the construction and function of a first aspect of pressure field generator 2 of stimulation device 1 is subsequently described in more detail.

FIG. 4 shows pressure field generator 2 in a first state, with the second chamber 4 being placed on the area of skin or body part 11 to be stimulated. The first state of pressure field generator 2 is characterized by a neutral deflection of the first chamber 3, i.e. no external force is exerted on the first chamber 3, for example, by the drive unit. Here, volume V1 of the first chamber is the standard volume of this chamber 3.

The body part 11 to be stimulated is an area of skin on the body, wherein for example an especially sensitive erogenous zone, clitoris 12, is shown. The use of the present invention is thus not limited to the female clitoris 11, instead stimulation device 1 can be used on all body parts or erogenous zones (such as the inside of the upper thighs, the loins, neck, nipples, etc.), which can be stimulated by means of media- or air-pressure massage and/or negative-pressure.

Due to being placed on the body part 11 to be stimulated, the second chamber 4 forms a chamber largely or completely

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sealed off from the exterior of pressure field generator 2, which is only still connected to the second chamber via connection element 5, wherein the edges of chamber 4 ideally form an air-tight bond with the surface of body part 11. Two communicating chambers 3 and 4 are created in this way, wherein corresponding pressure equalization via connection element 5 ensues between chambers 3 and 4 in the event of a volume modification in one of chambers 3 or 4.

Wall 31 of the first chamber 3 is secured by means of a holder 32. Holder 32 is in turn attached to housing 8. Wall 41 of the second chamber is further affixed to holder 32. Two mutually aligned openings in wall 41 of the second chamber and of holder 32 jointly form connection element 5, which connects the first chamber 3 and the second chamber 5. Wall 31, holder 32 and wall 41 are preferably adhered to each other media- or air-tightly. Alternatively, the latter can also be press-fitted or screwed together with each other (for example by means of sealing areas between housing 8 and the respective part). Holder 32 can also be adhered or screwed onto housing 8, for example.

Wall 31 of the first chamber 3 preferably consists of a flexible media- or airtight material, such as rubber. Holder 32 preferably consists of a rigid plastic, which is just as media- and airtight. Wall 41 of the second chamber is preferably made of a flexible, skin-friendly material, such as silicone or rubber.

FIG. 5 shows pressure field generator 2 of FIG. 4 in a second state, wherein the second chamber 4 is in turn placed on the body part 11 to be stimulated. The second state is characterized in that a force A affecting the first chamber 3 causes chamber 3 to expand. In detail, force A in this embodiment draws wall 31 of the first chamber 3 in a direction facing away from the second chamber 4.

Volume V2 in chamber 3 increases as a result, i.e., $V2 > V1$. To equalize the difference in pressure created between chambers 3 and 4, the media or air now flows from the second chamber 4 into the first chamber 3.

Assuming that the first state of the present pressure in chambers 3 and 4 corresponds to the currently prevailing external reference pressure (air pressure for example); the present overall pressure in the second state will now be less than the external reference pressure. This negative-pressure is designed in such a way that it is preferably less than the usual systolic blood pressure in the blood vessels of body part 11. The blood circulation in this area thus increases and clitoris 12 is better supplied with blood in the second state.

FIG. 6 shows pressure field generator 2 in a third state, wherein the second chamber 4 is in turn placed on the body part 11 to be stimulated. The third state is characterized in that a force B influencing the first chamber 3 causes a volume reduction or compression in chamber 3. In detail, the direction of force B is opposed to the direction of force A and distorts wall 31 of the first chamber in such a way that the resulting volume V3 of the chamber is less than volume V1. The compression of chamber 3 causes an positive-pressure in chamber 3, which is equalized by a media- or airflow through connection element 5 in the direction of the second chamber 4.

This media flow is now preferably directed by the orientation of opening 51 and/or of connection element 5 towards the body part 11 to be stimulated, in particular towards the glans of clitoris 12. The indirect (pressure) massage according to the invention ensues due to the medium flowing onto body part 11. The size of opening 51 is dimensioned in such a way that it is small enough in ratio to the volume displaced in the first chamber 3 to sufficiently accelerate the medium for a perceptible massage effect.

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Furthermore, the type of flow can not only be advantageously influenced by the size and orientation of opening 51, but also by the inner configuration of the connection element. For example, helix-shaped grooves in connection element 5 can cause the flow according to the invention to swirl, wherein the flow profile of the flow unfurls a "softer" or more turbulent effect on the body part to be stimulated. Alternatively, the resulting pressure field in the second chamber 4 can be adjusted by means of a plurality of openings 51, depending on use.

The advantageous factor of the arrangement shown in FIGS. 4 to 6 is that it is hygienically unproblematic (due to the avoidance of dead spaces, for example) and is simple to produce. For example, no valves or other openings in or on the first chamber 3 are required.

FIG. 7 shows a second aspect of the present invention with an alternative construction of pressure field generator 2. Walls 31 and 41 of the first and second chambers 3 and 4 respectively can thus engage with one another in such a way that they also form two communicating chambers with a connection element 5, as in the first aspect of the construction of pressure field generator 2. Thus, the separate holder is no longer required, while the second chamber 4 is replaceable. In addition, connection element 5 can be designed integrally or in one-piece with wall 41 of the second chamber 4. A replaceable chamber 4 has the advantage of allowing the use of any shapes of chamber 4 adjusted to the respective body part (a more detailed description thereof is provided later), without the entire stimulation device 1 needing to be replaced. Alternatively, the second chamber 4 can also be pluggably affixed to housing 8 (not shown in more detail). Wall 31 of the first chamber 3 can be adhered or screwed onto housing 8, for example.

Also, as shown in more detail in FIG. 7 by the broken line and double arrow C, the first chamber 3 is expanded and compressed by a force exerted perpendicularly to the axial direction of connection element 5. In principle, the force exerted directly or indirectly on the first chamber 3 by drive unit 5 can be exerted from any direction. The only decisive criterion here is that the volume of the first chamber 3 can be increased and decreased by drive unit 6.

FIG. 8 shows a third aspect of the invention with an integral or one-piece structure of pressure field generator 2. An elastic material, such as silicone or rubber, can be used as material for chambers 3 and 4. The advantage here is that any hygienically unsafe divide is avoided and the production effort is reduced. Pressure field generator 2 can be adhered or screwed onto housing 8 in this case too. Any modification of the volume in the first chamber 3 is analogous here, as described in conjunction with FIG. 7.

FIG. 9 shows a fourth aspect of the invention with an alternative construction of pressure field generator 2. The second chamber 4, a plurality of connection elements 5, as well as partial sections of wall 31 of the first chamber 3 are designed in one-piece. Alternatively, pressure field generator 2 can be constructed in two or more pieces from individual components, while safeguarding the geometrical example of FIG. 9 in a similar way to that shown in FIG. 4 or 7.

The volume in chamber 3 is modified in a similar way to a piston pump, although no valves are available here. A piston 63 is thus moved backwards and forwards by the drive unit, for example an electric motor or electromagnet, in the directions of the double arrow D. This type of drive has the advantage that the volume of the first chamber 3 can be simply reduced to zero or almost zero, thus allowing the first chamber 3 to be almost completely emptied.

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The embodiment of connection element 5, with a plurality of channels 52 and openings 51, leads to a distribution of the pressure field to a plurality of concentration points. While the embodiment of connection element 5 with only one channel, as described in conjunction with FIG. 6, leads to the formation of a strongly concentrated media- or airflow on a target area, the embodiment of connection element 5 shown in FIG. 9 allows the media- or airflow to be distributed to a plurality of target areas, thus allowing clitoris 11 to be blown not just on its glans, but equally from a plurality of directions as well, for example. Depending on use, this distribution of the airflow concentration to a plurality of areas can help to avoid any overstimulation and/or help to increase the stimulation area.

FIGS. 10 a to 10 c show a fifth aspect of the invention with (partial) cross-sections of a construction of pressure field generator 2 with a bending element 64 as drive for modifying the volume in the first chamber 3. Bending element 64 can, for example, be a conventional piezoelectric bending element, which distorts or bends once voltage is applied. In this aspect of the invention wall 31 of the first chamber 3 is a rigid or stiff construction, while bending element 64 is suitably dovetailed to the sides of the first chamber 3. The transition points between bending element 64 and wall 31 are sealed (elastically bonded for example). The drive for pressure field generator 2 is already integrated in this construction and an external drive is not required. An electric motor with an eccentric is not needed, for example. This allows, inter alia, the reduction of any disturbing natural oscillations due to the eccentric movement of the stimulation device.

In detail, FIG. 10 a shows pressure field generator 2 with bending element 64 in a neutral position. Thus, the volume of the first chamber 3 with bending element 64 in the neutral position is the standard volume. FIG. 10 b also shows the first chamber 3 with an excited and, consequently, outwardly bent bending element, while the volume of the first chamber 3 is increased, with a negative-pressure consequently prevailing in pressure field generator 2. FIG. 10 c shows a bending element of the first chamber 3 excited in the opposite direction to FIG. 10 b, which is why the volume in the first chamber 3 has decreased, with a positive-pressure consequently prevailing in pressure field generator 2.

FIG. 11 shows a second embodiment of the invention with a locally separated arrangement of chambers 3 and 4 of pressure field generator 2. Chambers 3 and 4 are connected via an extended connection element 5, which can be a longer flexible hose or even a rigid pipe. For example, connection element 5 may be 0.5 m in length. This enables housing 8 to be held in one hand, while the other hand holds the second chamber 4 on the body part 11 to be stimulated; or one can simply lay housing 8 aside, while the user holds only the second chamber 4 in his/her hands. The stimulation device in this embodiment can also be designed as a table device.

FIGS. 12 a) to 12 f) show various bottom and side views of other aspects of the second chamber 4 of the present invention. In detail, FIG. 12 a) shows a bottom view of a circular second chamber 4 with a centrally arranged opening 51; FIG. 12 b) a bottom view of a triangular second chamber 4 with a centrally arranged opening 51; FIG. 12 c) a bottom view of an oval second chamber 4 with a centrally arranged opening 51; and FIG. 12 d) a bottom view of an almost eight-shaped second chamber 4 with two openings 51 shifted to the center. FIG. 12 e) further shows a side cross-section of a second chamber 4 according to the invention, wherein the second chamber 4 has an additional extended contact surface or sealing bearing part 43 to the

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skin or a support part 43 to improve the sealing function of the second chamber 4 on the skin. The extended contact surface 43 may also have grooves or projections that improve the sealing function even more. FIG. 12 f) shows a side cross-section of a second chamber 4 with a plurality of separate connection elements 5 and an extended contact surface due to support part 43.

In principle, the form of the second chamber 4 can thus be adjusted to the anatomy of the erogenous zone to be stimulated. The form of chamber 4 in FIG. 12 a) is, for example, adjusted to the round shape of the breast, while the form of chamber 4 in FIG. 12 c) is better suited to the form of the female vulva. Furthermore, the shape of the second chamber 4 also determines the characteristic of the pressure field according to the invention. The size of the second chamber 4 in ratio the volume displaced from chamber 3 thus determines the amount of the achievable negative- or positive-pressure. Furthermore, the proximity of opening 51 of connection element 5 to the area of skin to be stimulated can also be used to determine the intensity of the massage effect according to the invention on said area of skin. A plurality of openings 51, cf. FIG. 12 d) allows the massage effect to be distributed to a plurality of areas. Thus, for example, the clitoris can be less directly stimulated at the very sensitive clitoris glans (cf. FIG. 12 e), and more stimulated at the areas surrounding the clitoris glans, in order to prevent overstimulation of the clitoris.

FIG. 13 shows a block diagram of an example of the functional construction of an embodiment of the present invention with a control device 7, a drive unit 6, lighting 9, an on/off switch 74, operating elements 71, a battery 76 and an external power supply 73.

Control device 7, which has a microcontroller or is hardwired, for example, initially controls the power supply of all users of stimulation device 1, as well as an optional charging and discharging process of battery 76 and/or a battery management. In particular, control device 7 controls the excitation of drive unit 6, such as the size of the deflection, the frequency, the modulation, etc.

Furthermore, control device 7 may have a memory in which at least one modulation or stimulation pattern (described in more detail in conjunction with FIG. 14 a) to d)) is saved. The excitation of drive unit 6 can now be activated via operating elements 71 in compliance with the previously saved stimulation pattern at the discretion of the user of stimulation device 1. The stimulation pattern of the pressure field can also be optionally and individually adjusted and saved by the user via the operating elements.

FIG. 14 a) shows the chronological sequence of a total pressure p in the pressure field generator (2) when using the latter for stimulation. The broken line provides the reference pressure, such as the currently prevailing atmospheric pressure that exists outside the pressure field generator (2). If the second chamber 4 is now placed on body part 11 to be stimulated, the originally prevailing ambient pressure in the pressure field generator (2) is maintained, for example. It is now assumed that the second chamber 4 is sealed tightly to the body part to be stimulated for the most part. Once the stimulation device is activated, drive unit 6 is activated or excited by control device 7 according to a previously saved stimulation pattern. Accordingly, the volume of the first chamber 3 and thus the total pressure in pressure field generator 2 are modified, with the pressure modifications being modified to the reference pressure. The pressure or stimulation pattern shown as an example in FIG. 14 a) develops a pulsed, regular pressure field. In phases of pressure increase, the erogenous zone to be stimulated is

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blown on or massaged, while in the times when a negative-pressure prevails, the blood circulation of body part 11, the clitoris for example, is promoted. Thus, time periods according to the invention exist (designated in FIG. 14 a) as I)) in which a negative-pressure prevails, while the clitoris is simultaneously indirectly massaged.

FIG. 14 b) shows three examples of alternative stimulation patterns. Thus, the area designated as II) shows a pulsed stimulation pattern with high amplitude. The area designated as III) shows a pulsed stimulation pattern with low amplitude. Furthermore, the area designated as IV) illustrates an irregular and asymmetrical stimulation pattern as regards chronological sequence and amplitude. The patterns can be varied according to individual bodily effect/use and according to individual wishes.

FIG. 14 c) shows another example of an alternative stimulation pattern. The strength of pressure may, for example, increase with time, in order to adjust to the user's state of excitement.

In addition to the explained embodiments, the invention allows other basic design principles. For example, different arrangements or constructions of the first chamber 3 may be arbitrarily combined with various embodiments of the second chamber 5 or connection element 5. For example, the first chamber 3 with the drive in FIG. 10 can be combined with the second chamber in FIG. 12 f).

Although only one first chamber 3 is shown in all embodiments, two or more first chambers 3 may be present, which are then appropriately activated simultaneously or time-delayed in such a way that their volume is modified in order to build up a pressure field according to the invention.

Although only one opening from the first chamber 3 to connection element 5 is shown in all embodiments, a plurality of openings for a connection element 5 or even more openings for a plurality of connection elements 5 may be present in the first chamber 3.

A stimulation device 1 can have a plurality of pressure field generator 2. Thus, for example, two pressure field generators may be available to stimulate two erogenous zones simultaneously.

The stimulation patterns according to the invention can deviate from the patterns shown in FIG. 14 a), b) and c), as long as they have a chronological sequence of over- and negative-pressures. For example, a relatively long-lasting negative-pressure can initially be built up at the beginning or after activation of the device (3 minutes for example), in order to effectively increase the blood circulation of the zone to be stimulated, whereupon pulsed negative- and over-pressures of a slowly increasing amplitude then follow.

LIST OF REFERENCE NUMERALS

- 1 Stimulation device
- 2 Pressure field generator
- 3 First chamber
- 4 Second chamber
- 5 Connection element
- 6 Drive unit
- 7 Control device
- 8 Housing
- 9 Lighting
- 11 Body part
- 12 Clitoris
- 31 Wall of first chamber
- 32 Holder
- 41 Wall of second chamber
- 42 Opening of first chamber

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- 43 Contact surface
- 51 Opening of connection element to second chamber
- 61 Drive shaft
- 62 Eccentric
- 63 Piston
- 64 Bending element
- 71 Operating element
- 72 Display
- 73 Power supply
- 74 On/off switch
- 75 Socket
- 76 Battery
- 77 Control board
- 78 Remote control

The invention claimed is:

1. A stimulation device for a clitoris, comprising:

a pressure field generator comprising:

- a first chamber having a single opening;
- a second chamber having first and second openings, the second opening of the second chamber for placing over the clitoris; and
- a connection element having a first opening and a separate second opening thereby forming a straight channel connecting the single opening of the first chamber with the first opening of the second chamber;

a drive unit that changes a volume of the first chamber in such a manner that a stimulating pressure field is generated in the second chamber via the connection element; and

a control device that actuates

the drive unit; and a housing enclosing the pressure field generator, the drive unit, and the control device; wherein:

the pressure field generated in the second chamber consists of a pattern of negative and positive pressures modulated with respect to a reference pressure, the first chamber is connected with the second chamber solely by the connection element,

the stimulation device has no valves,

the stimulation device is a portable hand-held device with a battery,

the connection element is rigid and the first and second openings of the connection element are aligned to one another so that a media flow during a compression of the first chamber is directed to the clitoris through the straight channel with a nozzle effect, and the second opening of the connection element is configured to face the clitoris through the second chamber.

2. The stimulation device according to claim 1, wherein the second chamber is made of a flexible material and/or is fitted to a shape of a vaginal labia minora in such a way that the latter is completely covered by the opening of the second chamber.

3. The stimulation device according to claim 1, wherein the second chamber is designed in one-piece with the connection element and the first chamber.

4. The stimulation device according to claim 1, wherein the second chamber of the stimulation device is arranged to be replaceable.

5. The stimulation device according to claim 1, wherein the second chamber has a sealing bearing part to enlarge a contact surface of the second chamber on a skin.

6. The stimulation device according to claim 1, wherein the respective modulation of the pressure field is modifiable by means of an operating element.

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7. The stimulation device according to claim 1, wherein the stimulation device has lighting for lighting the second chamber.

8. A system, comprising:

a stimulation device for a clitoris comprising: 5

a pressure field generator comprising:

a first chamber having a single opening;

a second chamber having first and second openings, the second opening of the second chamber for placing over the clitoris; and 10

a connection element having a first opening and a separate second opening thereby forming a straight channel connecting the single opening of the first chamber with the first opening of the second chamber; 15

a drive unit that changes a volume of the first chamber in such a manner that a stimulating pressure field is generated in the second chamber via the connection element; and

a control device that actuates the drive unit; 20

a housing enclosing the pressure field generator, the drive unit, and the control device; and

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a remote control device arranged separately to the stimulation device,

wherein:

the pressure field generated in the second chamber consists of a pattern of negative and positive pressures modulated with respect to a reference pressure, the first chamber is connected with the second chamber solely by the connection element,

the stimulation device has no valves,

the stimulation device is a portable hand-held device with a battery,

the connection element is rigid and the first and second openings of the connection element are aligned to one another so that a media flow during a compression of the first chamber is directed to the clitoris through the straight channel with a nozzle effect, and the second opening of the connection element is facing the clitoris through the second chamber; and

the control device of the stimulation device is remote controlled by the remote control device.

* * * * *

Exhibit 2



US009849061B2

(12) **United States Patent**
Lenke

(10) **Patent No.:** **US 9,849,061 B2**

(45) **Date of Patent:** **Dec. 26, 2017**

(54) **STIMULATION DEVICE HAVING AN APPENDAGE**

(58) **Field of Classification Search**

CPC A61H 19/00; A61H 19/30; A61H 19/34;
A61H 19/40; A61H 19/44; A61H 23/02;
A61H 9/0057

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(87) PCT Pub. No.: **WO2016/146206**

International Search Report and Written Opinion dated Jul. 22, 2016, in connection with International Patent Application No. PCT/EP2015/067017, 22 pages.

PCT Pub. Date: **Sep. 22, 2016**

(Continued)

(65) **Prior Publication Data**

US 2017/0027809 A1 Feb. 2, 2017

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(30) **Foreign Application Priority Data**

Mar. 13, 2015 (DE) 10 2015 103 694

(57) **ABSTRACT**

(51) **Int. Cl.**

A61F 5/00 (2006.01)

A61H 19/00 (2006.01)

(Continued)

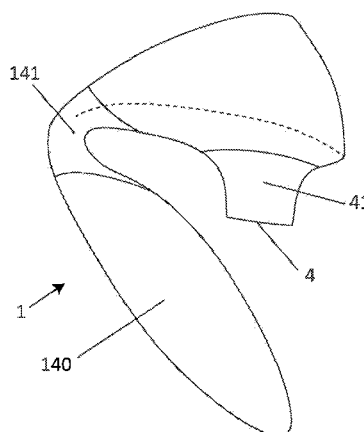
(52) **U.S. Cl.**

CPC **A61H 19/30** (2013.01); **A61H 9/005** (2013.01); **A61H 9/0057** (2013.01); **A61H 19/34** (2013.01);

(Continued)

The invention relates to a stimulation device (1) for erogenous zones, in particular for the clitoris (12), wherein the stimulation device (1) has the following: at least one pressure field generating arrangement (2) with at least one first chamber (3) and at least one second chamber (4) having at least one opening (42) for placing on a body part (11); at least one connection element (5) that connects the first chamber (3) to the second chamber (4); a drive unit (6) that varies the volume of the first chamber (3) such that a pressure field that serves for stimulation is generated via the

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connection element (5) in the second chamber (4); a control device (7) that activates the drive unit (6), and an appendage (140).

26 Claims, 7 Drawing Sheets

(51) Int. Cl.

A61H 9/00 (2006.01)

A61H 23/02 (2006.01)

(52) U.S. Cl.

CPC A61H 19/40 (2013.01); A61H 19/44 (2013.01); A61H 23/02 (2013.01); A61H 2201/0107 (2013.01); A61H 2201/0188 (2013.01); A61H 2201/0192 (2013.01); A61H 2201/1685 (2013.01); A61H 2201/5097 (2013.01); A61H 2205/087 (2013.01)

(58) Field of Classification Search

USPC 600/38
See application file for complete search history.

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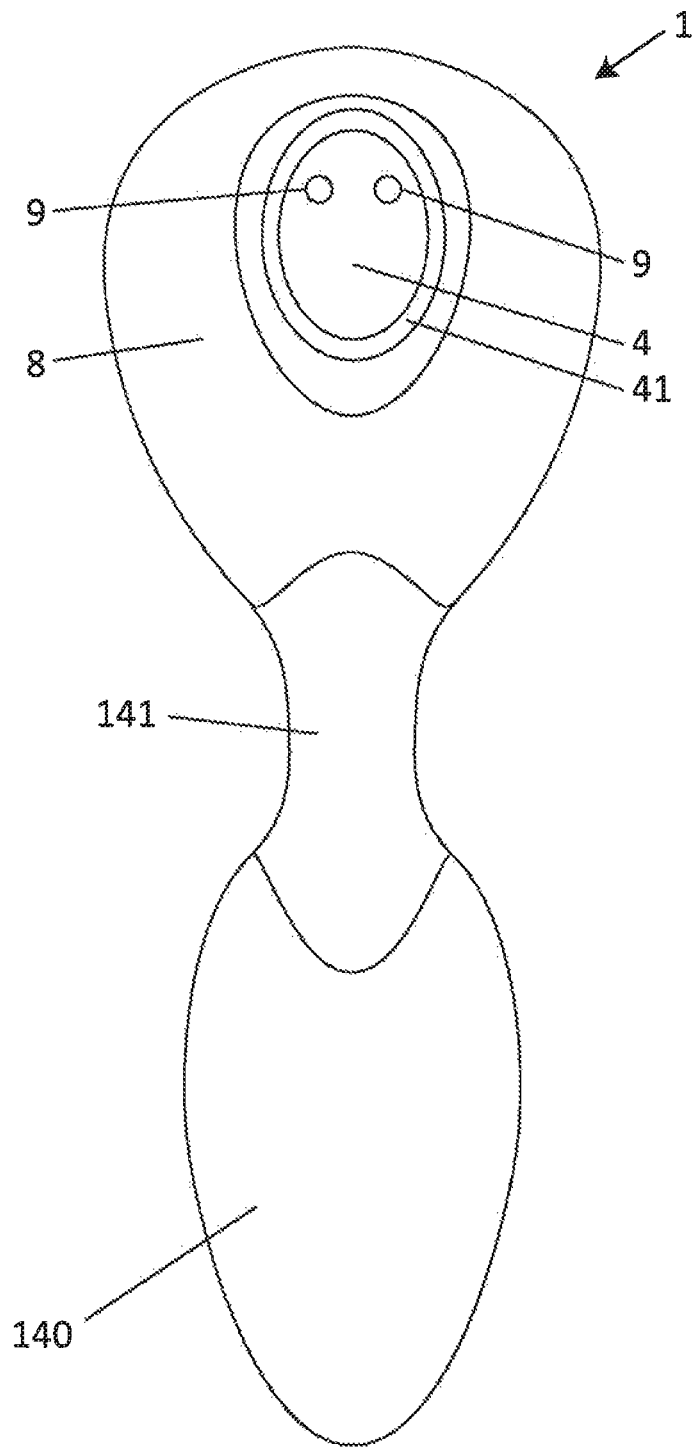
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Fig. 1



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Fig. 2

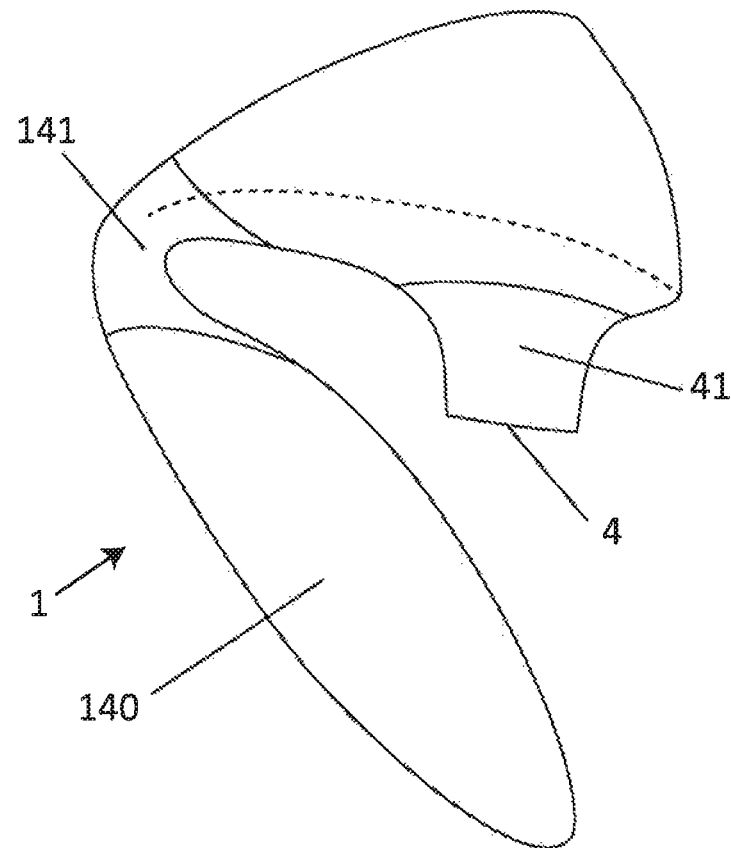


Fig. 3

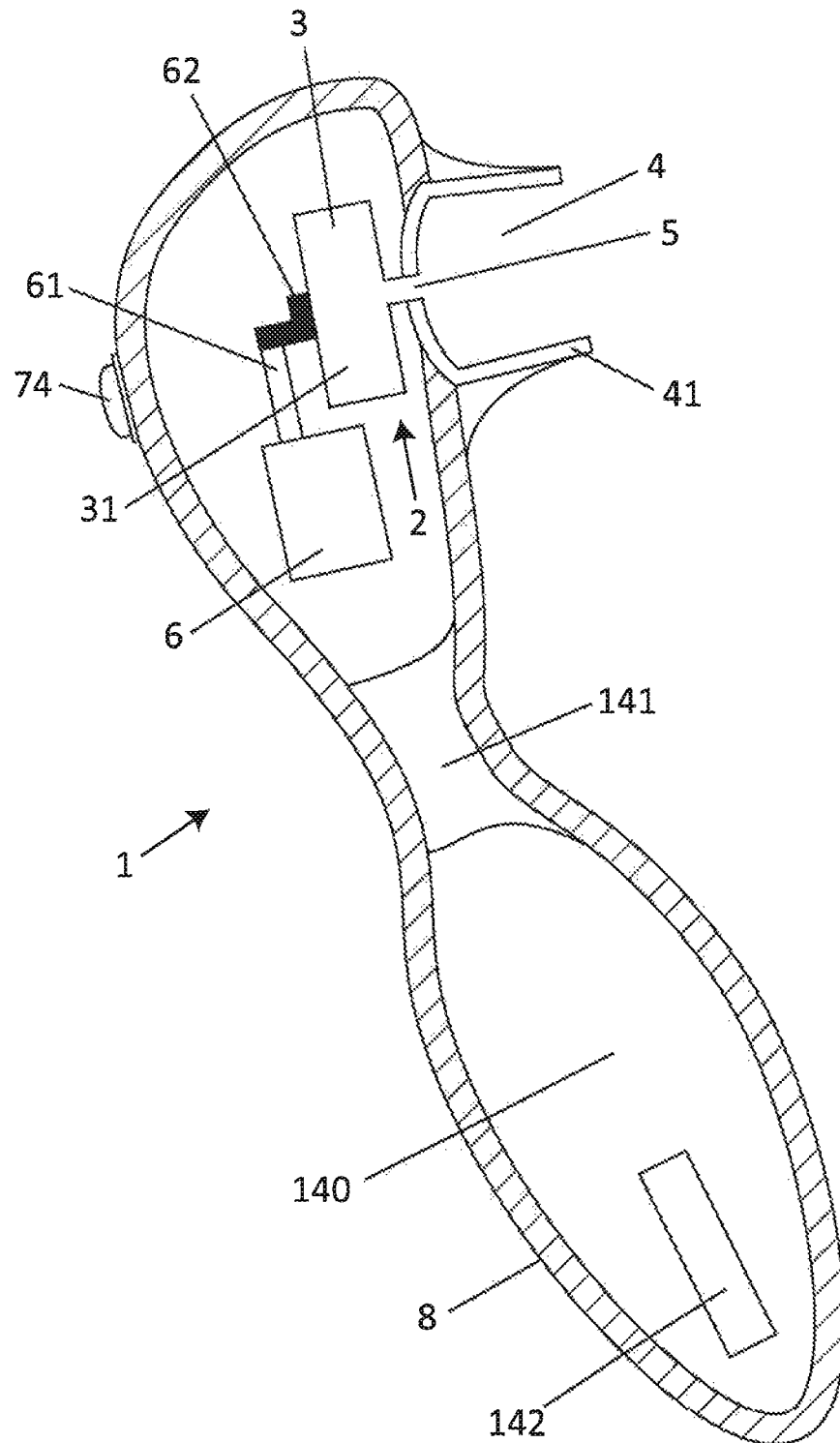


Fig. 4

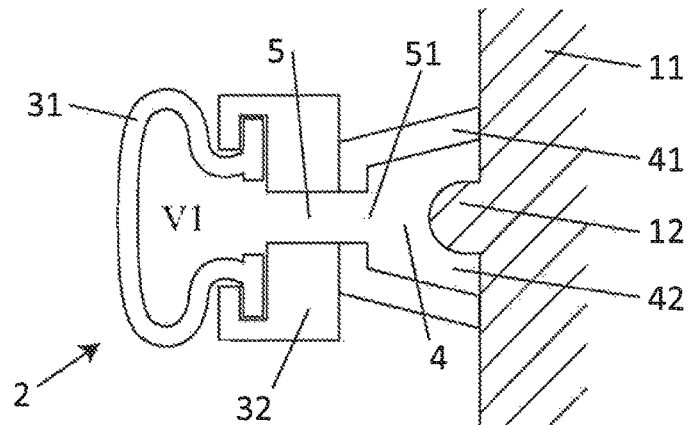


Fig. 5

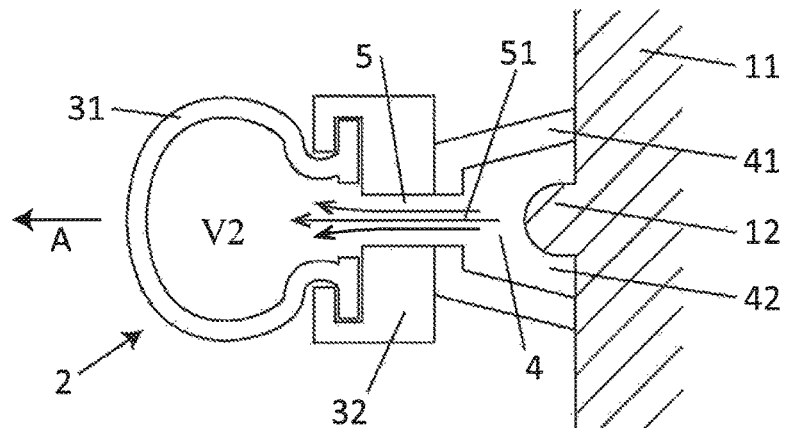


Fig. 6

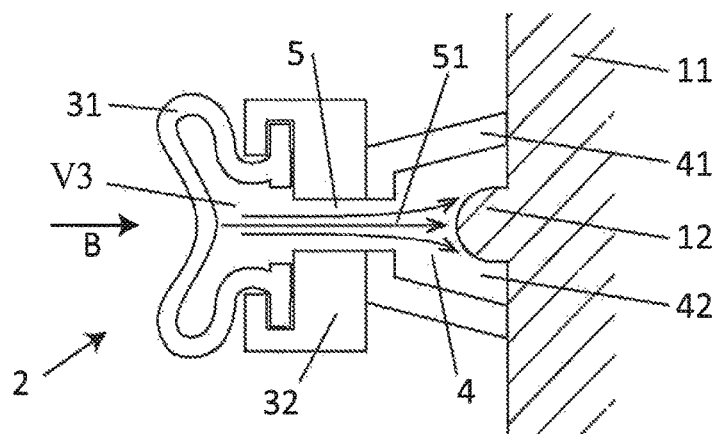


Fig. 7

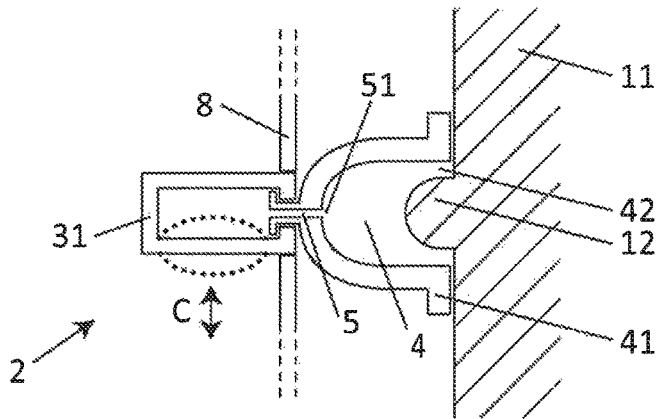


Fig. 8

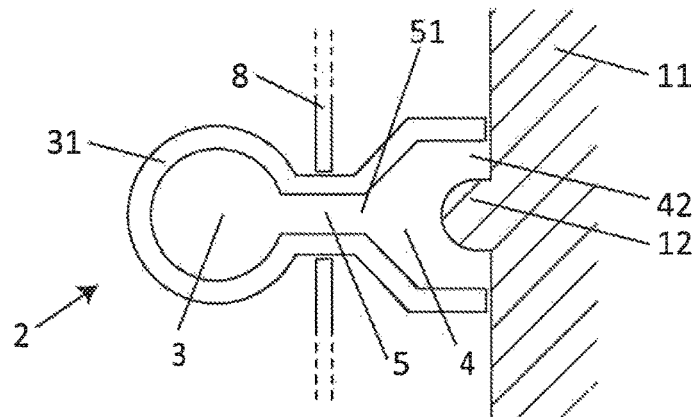


Fig. 9

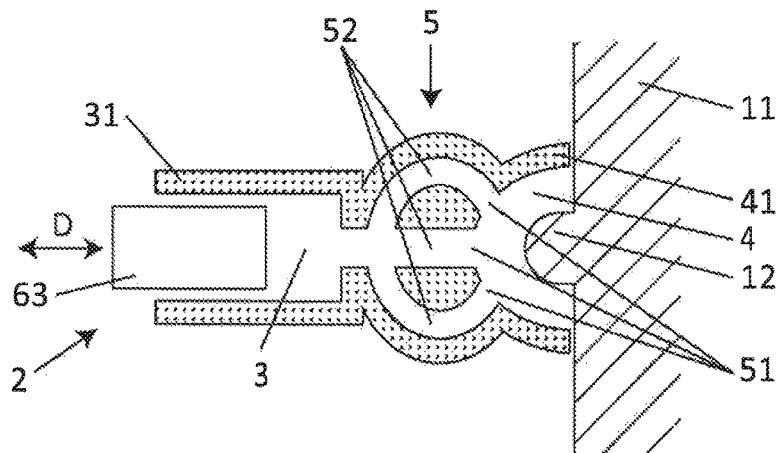


Fig. 10a

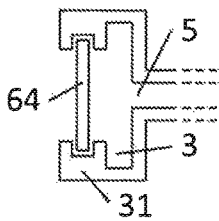


Fig. 10b

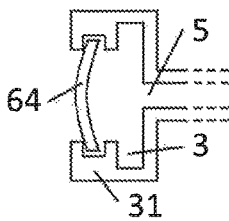


Fig. 10c

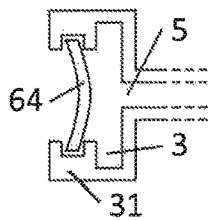


Fig. 11

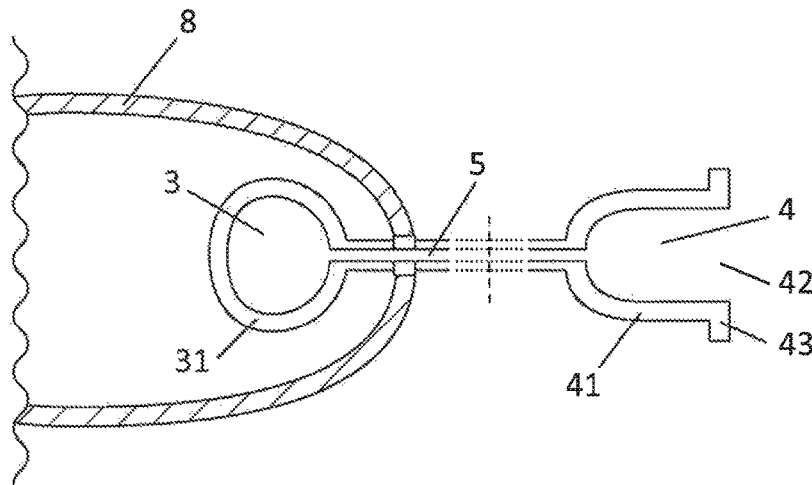


Fig. 12a

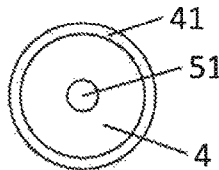


Fig. 12b

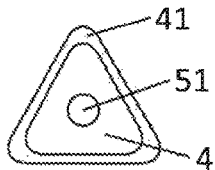


Fig. 12c

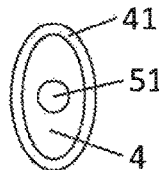


Fig. 12d

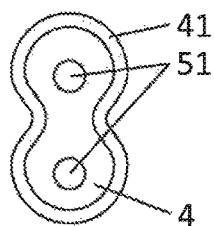


Fig. 12e

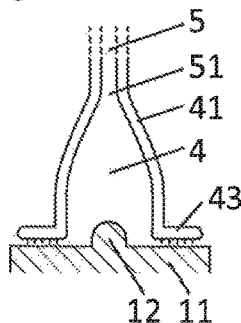


Fig. 12f

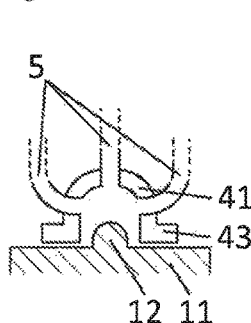


Fig. 13

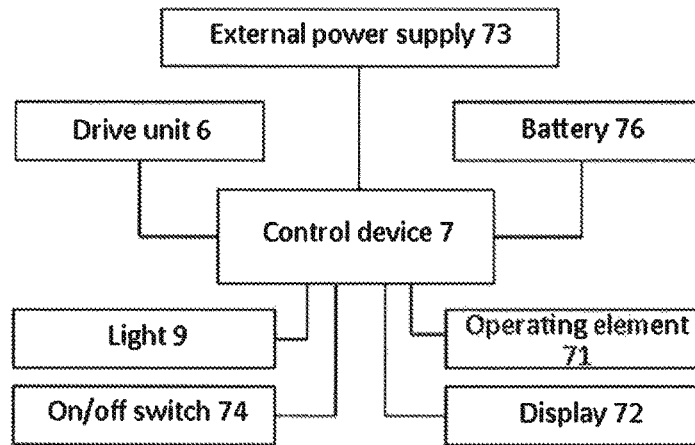


Fig. 14a

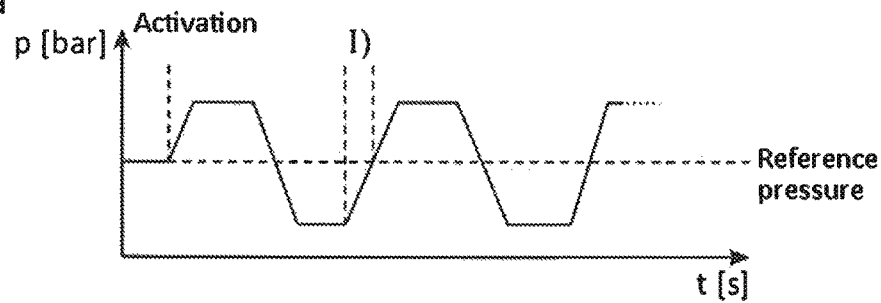


Fig. 14b

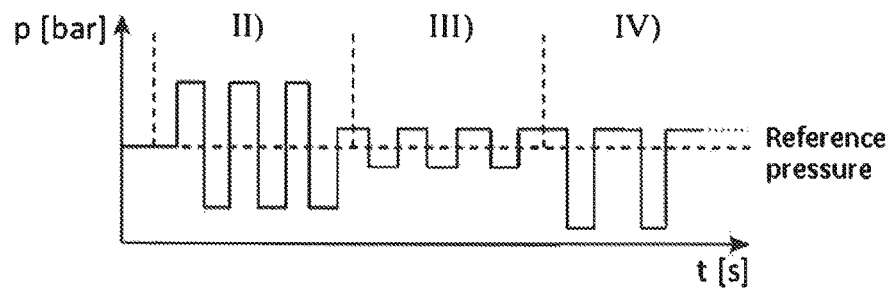
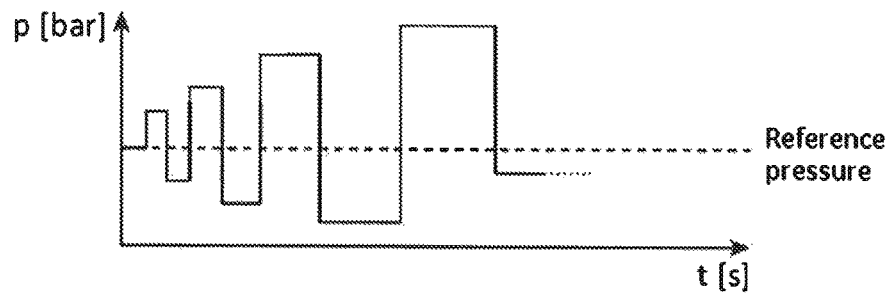


Fig. 14c



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STIMULATION DEVICE HAVING AN APPENDAGE

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a national stage (under 35 U.S.C. 371) of International Patent Application No. PCT/EP2015/67017, filed Jul. 24, 2015, which claims priority to German Patent Application No. 102015103694.0, filed Mar. 13, 2015, both of which are herein incorporated by reference in their entirety.

BACKGROUND OF THE INVENTION

The present invention relates to a stimulation device having an appendage for erogenous zones, in particular for the clitoris, a system with a stimulation device, and methods for stimulating body parts.

The erogenous zones of the human body can be stimulated with a variety of aids. For example, vibrators are used to apply a stimulus to a particular area of the skin by direct contact. These include stimulation aids for insertion into the human body, such as dildos.

Direct stimulation of the clitoris, for example using a clitoral massage vibrator, is frequently problematic. The clitoris is usually a woman's most sensitive erogenous zone. The entire clitoris is highly innervated, making it particularly touch-sensitive and responsive to sexual stimuli. In this context, the clitoral glans, in which the nerve cords of the two crura meet, should be emphasized in particular. Thus, on the one hand frequent application of a clitoral massage vibrator for direct stimulation leads to habituation effects or conditioning of the stimulated erogenous zone, while on the other the first applications of such a device may require certain practice or familiarization. Moreover, indirect stimulation of the female erogenous zones may be insufficient, or it may be desired to intensify the stimulation effect.

Furthermore, medical studies conducted in 2006 identified the female clitoris as the definitive starting point of the female climax, and for the first time neurologically proved the different qualities of sensation of clitoral and vaginal orgasm. Thus, both the clitoris and the vagina are capable of orgasm.

Furthermore, the sensitivity of the human erogenous zones, such as the clitoris, the inner and outer labia or the nipples, differs greatly from one individual to the next. Moreover, the sensitivity of the corresponding zone can change dramatically from one situation to another or even during a sexual act.

Furthermore, a rapid and pronounced stimulation of different erogenous zones is frequently desired.

Various direct and indirect forms of stimulation are usual practice, for example vacuum pumps and dildos.

For indirect stimulation of erogenous zones, and particularly the clitoris, conventional vacuum devices are used to stimulate the erogenous zones of the person concerned without directly contacting the main area to be stimulated. Thus, for example, vacuum pumps for the primary or secondary female sexual organs are known, which usually have a suction cup for placing on the appropriate area and a hand pump. The negative pressure exerted by this type of device on the clitoris, for example, generates a negative pressure in the clitoris itself which is usually below the systolic blood pressure. This difference in pressure results in an enlargement of the clitoris and/or stimulates the blood flow in the affected area. This vascular clitoral engorgement

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serves both to promote desire by increasing sensitivity and for visual and tactile manipulation. The improved blood circulation also results in an increased secretion of vaginal moisture, which makes the stimulation more pleasurable. However, the manual operation of the hand pump is often onerous or irksome. In addition, the long-term or interrupted application of negative pressure with this device category too may result in habituation effects, which limit the effectiveness of the device in the long term.

Electrically driven vacuum pumps are also increasingly used instead of a manually operated vacuum pump. As an example of this, WO 2006/05 82 91 A2 discloses a device for sexual therapy, wherein the arrangement comprises a tubular suction chamber for the clitoris, an electrical vacuum source (vacuum pump) and a plurality of air flow openings. Operation of the vacuum pump generates an ongoing air flow or air exchange in the chamber, in the area of the clitoris. This has the disadvantageous effect of drawing off by suction the vaginal moisture, which is increased as a result of the negative pressure, thus having a drying effect on the stimulated skin parts. Likewise, the drawn-off moist air results in contamination of the fluidically downstream vacuum arrangement, for example the vacuum pump. Such arrangements with vacuum pumps may thus be problematic from the point of view of hygiene, as vacuum pumps and the associated valves or ventilation components often have dead spaces and/or are difficult to clean. Furthermore, the device serves to treat the blood vessels in the clitoris and not to provide stimulation up to sexual climax.

U.S. Pat. No. 6,464,653 B1 discloses therapeutic devices and methods that generate a clitoral engorgement with the aid of a vacuum generated by a vacuum pump to assist in the treatment of clitoral disorders such as incontinence. A control valve or modulator that can be appropriately covered by a finger is used to manually adjust or vary the level of vacuum in the suction chamber. This requires the user's attention and may be irksome or distracting under certain circumstances. This relatively complex device having further valves also has the disadvantages relating to hygiene and dehydration that were mentioned above, with the device moreover serving for long-term therapeutic purposes and not for short-term sexual stimulation.

Thus, the devices of the prior art have the common disadvantage that the complexity of the arrangements generating negative pressure or positive pressure may be high and this device may have problems in respect of hygiene. Moreover, there is a problem of ease of handling the devices, which are frequently uncomfortable to hold and/or require habituation.

Furthermore, the devices of the prior art have the further common disadvantage in that habituation effects occur in the event of long-term, continuous or frequently recurring application of negative pressures.

Another disadvantage of some of the previously described vacuum devices is, firstly, that the negative pressure has to be limited by means of a control valve or a vacuum pump and, secondly, that the negative pressure is supposed to be relieved by means of manually opening a release valve before the suction cup is detached from the skin. Should one of the valves have a technical defect and/or the user operate the device incorrectly, there is a risk of injury in certain circumstances.

Thus, in view of the problems mentioned above, the object of the invention is to provide a stimulation device that has a simple construction, is easy and safe to use, and has a pronounced stimulation effect.

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The object of the invention is achieved by the stimulation device as claimed in claim 1. Advantageous developments and embodiments are the subject-matter of the further independent claims and dependent claims.

According to the invention, a pressure field generating arrangement of the stimulation device has at least one first chamber and at least one second chamber having at least one opening for placing on a body part or on the erogenous zone and at least one connection element that connects the first chamber to the second chamber.

This embodiment according to the invention, of chambers in fluidic communication via at least one connection element, allows simple generation of a pressure field in the second chamber by changing the volume in the first chamber, this pressure field being temporarily directed at the area of skin to be stimulated.

A pressure field, in the context of the invention, is a field of medium pressures that is variable over time and has temporary positive pressures and temporary negative pressures, a negative pressure being a pressure of medium that is below the reference pressure and a positive pressure being a pressure of medium that is above the reference pressure. As a result, the medium flows back and forth in the pressure field according to the invention. Thus, preferably a (largely) intermittent exchange of said medium can occur.

The medium is usually gaseous, preferably air, but may for example alternatively or in addition be a liquid medium, such as water or commercially available lubricant. For example, the chambers according to the invention may be filled with the lubricant prior to using the stimulation device. This also allows the corresponding area of skin to be stimulated with a suitable skin-friendly liquid instead of air, which may be desired, depending on the user's individual preference. As a further example, the stimulation device may also be used under water with water as the medium (in the bathtub, for example). In this case the stimulation device is waterproof in form.

The reference pressure is usually the atmospheric pressure acting on the stimulation device that prevails when application begins (i.e. prior to placing the stimulation device on the area of skin to be stimulated). In the preferred application of the stimulation device with air, the reference pressure is the currently prevailing air pressure or normal pressure. For example, when the device is applied under the normal standard conditions the reference pressure may be approximately 1 bar, from which it follows that a negative pressure according to the invention may be for example 0.7 bar and a positive pressure according to the invention may be for example 1.3 bar.

The pressure field according to the invention is used on the one hand to excite blood circulation of the area of skin to be stimulated, while on the other said area of skin is indirectly massaged. This combines two advantageous effects. The increased blood circulation makes the erogenous zone of the person concerned more sensitive, while moreover generating a massaging effect that serves to stimulate the erogenous zone, for example for sexual arousal up to climax. The massaging effect is generated by the kinetic energy of the medium flowing out of the first chamber through the connection element against the surface of the area of skin to be stimulated. In this way, the massaging effect created by the pressure field is generated indirectly, i.e. without the skin part to be stimulated being in direct contact with a solid body such as a vibrator.

By the exemplary application to the clitoris of the pressure field which is variable over time according to the invention, the pressure field imitates a stimulation that

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usually occurs during sexual intercourse. Likewise, the motion of congress during this generates a varying stimulus of the clitoris. It is thus a lifelike simulation of the natural act of congress, with medical findings confirming that application of the pressure field according to the invention causes neither habituation effects nor addiction. This is due in particular to the alternating application of negative and positive pressures (or indeed to the non-continuous application of only one type of pressure).

Furthermore, the maximum applicable pressure is typically limited by the maximum load that may be put on the area of skin to be stimulated. Thus, for instance, too high a negative pressure harbors the risk of painful injury, in particular in erogenous zones. Stimulation devices working only with negative pressures are usually limited to this maximum in their mode of operation. By contrast, according to the invention the combination of positive and negative pressures creates an extended operational range of the stimulation-triggering pressure field or effect, as the operational range of the pressure can now be exploited to the maximum in both the positive and the negative range.

The orientation of the at least one connection element towards the area of skin to be stimulated allows the pressure field to work directly, the pressure field being decisively affected by the configuration of the at least one connection element and the at least one opening from the connection element into the second chamber, and is thus adjustable depending on the application of the stimulation device. Thus, the at least one opening of the connection element may be located opposite, preferably directly opposite, the body part to be stimulated. For example, the connection element in a stimulation device intended for the clitoris may have, between the first and second chamber, a single passage opening having a nozzle effect on the clitoral glans. Alternatively, the at least one connection element may comprise a plurality of passage openings, for example four, between the chambers if a relatively large area of skin is to be stimulated.

Furthermore, after placing the halfway or partially opened second chamber on the area of skin to be stimulated, a closed system of medium or air flow is created in the pressure field generating arrangement. Thus, the medium or air is moved decisively back and forth between the chambers, while an exchange with medium or air from outside the system is at least largely avoided. Thus, the first chamber is preferably connected exclusively to the second chamber via or through the connection element. Thus, the first chamber has no connections other than those to the second chamber; for example, there is no direct connection between the first chamber and the environment surrounding the device via a pressure valve or an air discharge channel.

For example, the temperature of the air in the flow system according to the invention rapidly adjusts to skin temperature, while the irksome supply of new (possibly cold) air from outside the system, as may be the case when using vacuum pumps of the prior art inter alia, is avoided. Drying effects are moreover avoided, as very little or no removal of stimulation-promoting fluid, such as bodily fluid, occurs in a closed system.

Furthermore, due to the simple construction, the pressure field generating arrangement according to the invention has the advantage of better hygiene and improved cleaning capacity. Here, the present invention avoids valves or pumps/compressors with potential dead spaces and places that cannot be cleaned. The pressure field generating arrangement according to the invention is thus easy to clean. For example, the stimulation device can be cleaned in a

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simple manner by filling the first chamber with a cleaning agent and activating the pressure field. Alternatively, the second chamber can be arranged to be replaceable, which also simplifies the cleaning of both chambers. Furthermore, the chambers according to the invention and the connection element of the pressure field generating arrangement can be manufactured in one piece, wherein they are made for example of a single plastic molded part (e.g. rubber). As a further alternative, the first chamber, the second chamber and the connection element may be made in one piece.

Moreover, the construction according to the invention has the result of avoiding complex fluid engineering elements such as valves, which results in simplified manufacture.

Furthermore, the stimulation device according to the invention has a drive unit that varies the volume of the first chamber such that a pressure field is generated via the connection element in the second chamber, this pressure field serving to stimulate the erogenous zone, and a control device that activates the drive unit.

The principle of the invention means that the medium transported between the chambers is limited in volume to the maximum volume of the first chamber. Moreover, the transported volume can be further limited, as a result of its construction, by the maximum possible change in volume brought about by the drive unit.

Consequently, the maximum positive or negative pressure the stimulation device can build up in the second chamber is limited due to the dimensions of the components of the pressure field generating arrangement and the drive. In particular, the maximum positive or negative pressure can be limited to an amount that minimizes or rules out any risk of injury for the areas of skin to be stimulated. As a result, a safety valve that is usual in the prior art, or a manual intervention in the stimulation process by the user, such as the opening of a release valve, is for example rendered unnecessary.

Furthermore, the variation over time in the pressure field or the modulation of the pressure field by the control device is controlled largely automatically. Thus, the modulation of the pressure field, such as intensity, time profile or sequence, can be previously stored in the control device. Preferably, the variation over time in the pressure field can have a regular or recurring (stimulation) pattern, such as pulses at a predetermined cycle rate or regularly alternating pulse sequences. This allows the user's interaction with the stimulation device to be limited according to the invention to switching on and off and selecting the stimulation pattern, while the stimulation device automatically executes the preferred stimulation pattern. Thus, according to the invention, the complexity of using the stimulation device is low, particularly when compared with conventional (medical) vacuum stimulation devices. Alternatively or in addition, the stimulation pattern of the stimulation device can be individually configured by the user during or before operation.

Moreover, according to the invention the stimulation device is provided with (at least) one appendage. On the one hand this appendage may be used as a handle in order to hold the stimulation device easily and comfortably, and on the other the appendage may also be used as a direct stimulation aid for insertion into the human body or indeed for placing on the human body.

If the appendage is inserted into the human body, it serves for direct stimulation of the body part concerned. Thus, it supplements the indirect stimulation effect of the pressure field generating arrangement. It is thus possible for a direct and an indirect stimulation of a plurality of erogenous zones to occur simultaneously or alternately. For example, the

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appendage may be inserted into the female vagina, while stimulation of the clitoris may take place at the same time or alternately by means of the pressure field according to the invention. Accordingly, the principle according to the invention of the combined direct and indirect stimulation may also be applied to other body parts, or the erogenous zones thereof. For example, the appendage may be placed on a woman's clitoris while the pressure field generating arrangement stimulates another woman's or the same woman's clitoris.

In this way, the stimulation device having an appendage may be used by only one person or indeed by two different people for the stimulation of a plurality of erogenous zones.

The combination of direct and indirect stimulation results in an improvement in the stimulation effect and a versatile applicability of the stimulation device. Moreover, further, alternative types of play during the sexual act are possible using the inventive stimulation device having an appendage.

Thus, according to the invention a stimulation device which has a plurality of cumulative orgasm- or stimulation-triggering effects and is suitable for the stimulation of a plurality of erogenous zones, in particular the female clitoris, is provided. Furthermore, a device is provided which avoids dehydration of the erogenous zones to be stimulated, is hygienic and avoids habituation effects.

According to a development of the invention, the appendage is movable with the pressure field generating arrangement, for example being connected by means of a joint at one end of the appendage. In this way, the stimulation device may be adapted to the anatomy of the human body in question and to its use. For example, the appendage may be inserted into the female vagina in order then to adapt the angle between the pressure field generating arrangement and the appendage such that the opening of the second chamber can be placed precisely over the clitoris. Consequently, the area of the body between the clitoris and the vagina is stimulated from both sides, mutually enhancing the effects of direct and indirect stimulation.

If the appendage is used as a handle for holding the stimulation device, the angle between the handle and the opening of the second chamber can be adapted to suit the preferences of the user of the device.

According to a development of the invention, the appendage is a stimulation aid which is shaped such that the appendage can be inserted into the human body, for example the vagina, for direct stimulation. In this case, the appendage preferably takes the form of a dildo. Here, sharp corners in particular are avoided. Thus, the appendage is preferably in a form such that it can be inserted smoothly into body cavities and/or also remain inserted therein.

According to a development of the invention, the appendage (140) is an elongate, lens-shaped or pillow-shaped body which is adapted such that the appendage can be inserted smoothly into the female vagina. This improves the direct stimulation effect.

According to a development of the invention, the appendage is mounted on the pressure field generating arrangement such that the stimulation device is unitary in form. Here, unitary means in particular that the stimulation device having an appendage and a pressure field generating arrangement takes the form of an integrated, cohesive device. Preferably, in this case the appendage and the pressure field generating arrangement transition into one another seamlessly. This improves hygiene and operability of the stimulation device.

According to a development of the invention, the appendage has a vibration device. This vibration device may be

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actuated such that the appendage vibrates, as known in the case of electromechanically operated dildos. In this case, the vibration may either be activated independently of the other parts of the stimulation device, or indeed the vibration may be controlled by means of the control device, which in that case controls the drive unit of the pressure field generating arrangement as well. Preferably, the vibration may be controllable in a conventional manner as regards intensity, duration and sequence. The vibration intensifies the direct stimulation effect.

According to a further aspect of the invention, according to further independent claim 20 a system having the stimulation device according to the invention is proposed which has a remote control device arranged separately from the stimulation device, wherein the control device of the stimulation device is remotely controlled by the remote control device. This allows a conventional wireless (for example via radio) or wired remote control to be employed in order to allow remote-controlled modulation of the stimulation device or activation thereof by another user.

According to a further aspect of the invention, as claimed in claims 21 to 25, methods for stimulating body parts, in particular the clitoris, are proposed. The associated advantageous effects are explained in more detail above in relation to the pressure field and the appendage.

According to a further aspect of the invention as claimed in claim 19, the use of the stimulation device according to the invention as a sex toy for stimulating the female clitoris is proposed. As explained in the introduction, the female clitoris is a particularly sensitive erogenous zone in women, which is why the use according to the invention of an indirect massaging stimulation, combined with a negative-pressure stimulation, for this body part for stimulation up to orgasm appears particularly advantageous.

In the present invention, the methods for stimulating erogenous zones serve for sexual pleasure, and thus the methods do not serve for medical, for example therapeutic, purposes.

The above-described features and functions of the present invention, and further aspects and features, are further described below with the aid of a detailed description of preferred embodiments with reference to the attached illustrations.

BRIEF DESCRIPTION OF THE DRAWINGS

In the figures:

FIG. 1 shows a front view of a first embodiment of the stimulation device according to the invention, with an appendage in a straight position;

FIG. 2 shows a side view of the first embodiment of the stimulation device according to the invention, with the appendage in an angled position;

FIG. 3 shows a schematic cross section through the first embodiment of the stimulation device according to the invention;

FIG. 4 shows a cross section through a pressure field generating arrangement of a first aspect of the present invention, in the first state;

FIG. 5 shows a cross section through a pressure field generating arrangement of a first aspect of the present invention, in the second state;

FIG. 6 shows a cross section through a pressure field generating arrangement of a first aspect of the present invention, in the third state;

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FIG. 7 shows a cross section through a pressure field generating arrangement of a second aspect of the present invention;

FIG. 8 shows a cross section through a pressure field generating arrangement of a third aspect of the present invention;

FIG. 9 shows a cross section through a pressure field generating arrangement of a fourth aspect of the present invention;

FIGS. 10a), b) and c) show cross sections through a pressure field generating arrangement of a fifth aspect of the present invention;

FIG. 11 shows a partial cross section through a second embodiment of the stimulation device according to the invention;

FIGS. 12a) to f) show various bottom and side views of further aspects of a second chamber of the present invention;

FIG. 13 shows a block diagram of an embodiment of the present invention; and

FIGS. 14a) to c) show graphs of various pressure modulation patterns of the present invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

With reference to FIGS. 1, 2 and 3, a first embodiment will be explained below. FIG. 1 shows a front view of the first embodiment of the stimulation device 1 according to the invention, with an appendage 140 in a straight position, while FIG. 2 further shows a side view of the stimulation device 1 with the appendage 140 in an angled position, and FIG. 3 shows a cross section of the first embodiment of the stimulation device 1 according to the invention.

The first embodiment of the stimulation device 1 is a preferably portable electrical or small device that has a housing 8, a pressure field generating arrangement 2, an optional on/off switch 74 and an optional light 9.

The housing 8 preferably takes an ergonomic form such that it can be held comfortably in one hand and has no sharp or pointed edges. Furthermore, the housing 8 may be made of a plastics material such as polycarbonate (PC) or acrylonitrile butadiene styrene (ABS). Moreover, the gripping areas or even the entire housing may be supplemented by or be made of a silicone which has advantageous tactile properties. The housing 8 preferably takes an at least water-resistant or splash-proof form, for example protection class IP 24. Furthermore, the broken line in FIG. 2 indicates an optional side edge of the housing 8.

The optional on/off switch 74 serves to activate and deactivate the stimulation device 1. This on/off switch 74 may for example be a push button, which switches the stimulation device 1 on or off when held down, or a latching slide switch. Alternatively, it may be possible to switch the stimulation device 1 on and off by remote control.

The pressure field generating arrangement 2 of a first embodiment has a first chamber 3 in the interior of stimulation device 1, a second chamber 4 for placing on a body part 11 to be stimulated, and a connection element 5 that connects the first chamber 3 to the second chamber 4.

A drive unit 6, for example an electric motor, drives the first chamber 3 via a shaft 61 and by means of a cam 62 (or alternatively by means of a connecting rod) such that the volume of the first chamber 3 changes in accordance with rotation of the shaft 61 of the drive unit 6. On this point, it should be noted that any types of drive that cause a deflection of the wall 31 of the first chamber 3 for a change in volume can in principle be used in the stimulation device 1.

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This may for example be performed hydraulically, pneumatically, piezoelectrically, mechanically or electromagnetically. Examples of this are described in more detail below.

A control device 7 activates the drive unit 6, optional operating elements 71 and at least one optional display 72. Here, the control device 7 and the drive unit 6 are supplied with power for example by the internal battery 76 and/or the external power supply 73.

The stimulation device 1 further has at least one appendage 140. This appendage 140, which is preferably part of the housing 8, may optionally be moved or angled in relation to the housing part in which the pressure field generating arrangement 2 is accommodated. Here, the appendage may be angled or indeed rotated by means of a joint 141. The joint 141 may for example take the form of a plastically deformable plastic part, an adjustable joint or a hinge. FIG. 2 shows an example of a position of the appendage 140 which is angled in relation to the section of the housing 8 of the stimulation device 1 in which the pressure field generating arrangement 2 is accommodated. Alternatively, the appendage may also take a rigid or immovable form.

The appendage 140 is preferably a stimulation aid for insertion into the human body, for example the vagina or other bodily orifices. Here, the appendage 140 is shaped for example as a conventional dildo. Alternatively, the appendage may be constructed such that it is adapted to the human anatomy of another bodily orifice, for example the mouth. Moreover, the appendage 140 may take a form such that it can also be used as a handle in order to hold the stimulation device 1 comfortably.

Moreover, the appendage 140 may optionally have a vibration device 142 that can be capable of being switched on and/or controlled. The vibration device 142 causes the appendage to undergo mechanical vibrations that support the direct stimulation effect of the appendage 140.

Optionally, the appendage 140 is mounted on the section of the housing 8 that accommodates the pressure field generating arrangement 2 such that the (entire) housing 8 of the stimulation device 1 takes a unitary form. In this way, the housing 8 creates the impression of being in one piece, for example by means of flexible and/or seamless connection elements of the housing 8. Alternatively, the housing 8, including the appendage 140, may have a silicone coating.

In a straight or non-angled orientation of the appendage 140, as shown in FIG. 1, the stimulation device 1 can be comfortably held, or indeed inserted into bodily orifices in a simple manner. If the appendage 140 is angled, as shown in FIG. 2, for example after insertion, the opening 42 can thus be guided out of the body part 11 to be stimulated. In this angled position of the stimulation device 1, both a direct and an indirect stimulation of at least one erogenous zone of the body can take place simultaneously. In this case, the body part 11 to be stimulated is located between the appendage 140 and the pressure field generating arrangement 2.

Furthermore, an optional light 9 can be provided on or in the housing 8. Here, the light 9 preferably serves for lighting the interior of the second chamber 4. The light 9 can either be switched on by the user or automatically activated when the stimulation device 1 is activated. Furthermore, the light 9 can take the form of energy-saving light emitting diodes. The light can for example serve in the dark as an orientation aid for the user of the stimulation device 1, or as additional visual stimulation.

With reference to FIGS. 4, 5 and 6, the construction and function of a first aspect of the pressure field generating arrangement 2 of the stimulation device 1 will be described below in more detail.

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FIG. 4 shows the pressure field generating arrangement 2 in a first state, with the second chamber 4 placed on the area of skin or body part 11 to be stimulated. The first state of the pressure field generating arrangement 2 is characterized by a neutral deflection of the first chamber 3, i.e. no external force acts on the first chamber 3, for example from the drive unit. Here, the volume V1 of the first chamber is the standard volume of this chamber 3.

The body part 11 to be stimulated is an area of skin on the body, wherein here for example a particularly sensitive erogenous zone, the clitoris 12, is shown. Thus, use of the present invention is not limited to the female clitoris 11, however; rather, the stimulation device 1 can be applied to all body parts or erogenous zones (such as the inside of the thighs, lumbar region, nape of the neck, nipples, etc.) which can be stimulated by means of medium- or air-pressure massage and/or negative pressure.

Because it is placed on the body part 11 to be stimulated, the second chamber 4 forms a chamber that is largely or completely closed off from the exterior of the pressure field generating arrangement 2 and whereof the only remaining connection to the second chamber is via the connection element 5, wherein the edges of chamber 4 ideally form an air-tight enclosure with the surface of the body part 11. Two communicating chambers 3 and 4 are created in this way, wherein a corresponding pressure equalization between the chambers 3 and 4 via the connection element 5 occurs in the event of a change in volume in one of the chambers 3 or 4.

A wall 31 of the first chamber 3 is secured by means of a holder 32. The holder 32 is in turn attached to the housing 8. The wall 41 of the second chamber is furthermore mounted on the holder 32. Two mutually aligned openings in the wall 41 of the second chamber and the holder 32 together form the connection element 5, which connects the first chamber 3 and the second chamber 4. In this arrangement, the wall 31, the holder 32 and the wall 41 are preferably joined to each other by adhesion to be medium- or air-tight. Alternatively, they can also be press-fitted or screwed to each other (for example with the aid of sealing areas between the housing 8 and the respective part). The holder 32 can also be joined to the housing 8 for example by adhesion or screws.

The wall 31 of the first chamber 3 is preferably made of a flexible medium- or air-tight material such as rubber. The holder 32 is preferably made of a rigid plastics material which is likewise medium- or air-tight. The wall 41 of the second chamber is preferably made of a flexible, skin-friendly material such as silicone or rubber.

FIG. 5 shows the pressure field generating arrangement 2 of FIG. 4 in a second state, wherein the second chamber 4 is once again placed on the body part 11 to be stimulated. The second state is characterized in that a force A acting on the first chamber 3 causes the chamber 3 to expand. To be precise, in this exemplary embodiment the force A draws the wall 31 of the first chamber 3 in a direction away from the second chamber 4.

This increases the volume V2 in the chamber 3, i.e. $V2 > V1$. To equalize the difference in pressure created between the chambers 3 and 4, the medium or air now flows from the second chamber 4 into the first chamber 3.

Assuming that in the first state the pressure in the chambers 3 and 4 corresponds to the currently prevailing external reference pressure (air pressure for example), the overall pressure that is present in the second state will be lower than the external reference pressure. This negative pressure is set such that it is preferably lower than the usual systolic blood pressure in the blood vessels of the body part 11. The blood

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circulation in this area thus increases, and the clitoris 12 is better supplied with blood in the second state.

FIG. 6 shows the pressure field generating arrangement 2 in a third state, wherein the second chamber 4 is once again placed on the body part 11 to be stimulated. The third state is characterized in that a force B acting on the first chamber 3 causes a volume reduction or compression in the chamber 3. To be precise, the direction of the force B is opposed to the direction of the force A and deforms the wall 31 of the first chamber such that the resulting volume V3 of the chamber is smaller than the volume V1. The compression of the chamber 3 causes a positive pressure in the chamber 3, which is equalized by a medium or air flow through the connection element 5 in the direction of the second chamber 4.

This flow of medium is now preferably directed, by the orientation of the opening 51 and/or of the connection element 5, towards the body part 11 to be stimulated, in particular towards the glans of the clitoris 12. The indirect (pressure) massage according to the invention occurs as a result of the medium flowing onto the body part 11. The size of the opening 51 is in this case dimensioned such that it is small enough in relation to the volume displaced in the first chamber 3 to sufficiently accelerate the medium for a perceptible massaging effect.

Furthermore, the type of flow can not only be advantageously influenced by the size and orientation of the opening 51 but also by the inner configuration of the connection element 5. For example, helical grooves in the connection element 5 can cause the flow according to the invention to swirl, wherein the flow profile develops a "softer" or more turbulent action on the body part to be stimulated. Alternatively, the pressure field produced in the second chamber 4 can be adjusted to suit the application by means of a plurality of openings 51.

The advantage of the arrangement shown in FIGS. 4 to 6 is that it is unproblematic from the point of view of hygiene (because dead spaces are avoided, for example) and is simple to manufacture. For example, no valves or further openings in or on the first chamber 3 are required.

FIG. 7 shows a second aspect of the present invention with an alternative construction of the pressure field generating arrangement 2. Here, the walls 31 and 41 of the first and second chambers 3 and 4 can engage with one another such that, as in the first aspect of construction of the pressure field generating arrangement 2, they form two communicating chambers with a connection element 5. Thus, a separate holder is not required, while the second chamber 4 is replaceable. Moreover, the connection element 5 can take a form integral or in one piece with the wall 41 of the second chamber 4. A replaceable chamber 4 has the advantage that in this way various shapes of the chamber 4 that are adjusted to the respective body part can be used (a more detailed description thereof is provided below) without the need to replace the entire stimulation device 1. Alternatively, the second chamber 4 can also be attached to the housing 8 by being pushed on (not shown in more detail). The wall 31 of the first chamber 3 can be joined to the housing 8 by adhesion or screws for example.

It is also possible, as shown in more detail in FIG. 7 by the broken line and the double arrow C, for the first chamber 3 to be expanded and compressed by a force acting perpendicularly to the axial direction of the connection element 5. In principle, the force exerted indirectly or directly on the first chamber 3 by the drive unit 5 can be exerted from any

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direction. The only decisive criterion here is that the volume of the first chamber 3 can be increased and decreased by the drive unit 6.

FIG. 8 shows a third aspect of the invention with a one-piece structure of the pressure field generating arrangement 2. Here, a resilient material such as silicone or rubber can be used as material for the chambers 3 and 4. The advantage here is that any gaps that are dubious from the point of view of hygiene are avoided, and the cost of manufacture is reduced. The pressure field generating arrangement 2 can be joined to the housing 8 by adhesion or screws in this case too. A change in the volume of the first chamber 3 occurs here in a manner analogous to that described in conjunction with FIG. 7.

FIG. 9 shows a fourth aspect of the invention with an alternative construction of the pressure field generating arrangement 2. Here, the second chamber 4, a plurality of connection elements 5, and partial sections of the wall 31 of the first chamber 3 are constructed in one piece. Alternatively, the pressure field generating arrangement 2 can also be constructed in two or more pieces from individual components, while retaining the geometric shape of FIG. 9, in a similar way to that shown in FIG. 4 or 7.

In this case, the volume in the chamber 3 is changed in a manner similar to a piston pump, although there are no valves of any kind here. Thus, a piston 63 is moved back and forth by the drive unit, for example an electric motor or electromagnet, in the directions of the double arrow D. This type of drive has the advantage that the volume of the first chamber 3 can be reduced to zero or approximately zero in a simple manner, thus allowing the first chamber 3 to be almost completely emptied.

The embodiment of the connection element 5, with a plurality of channels 52 and openings 51, results in a distribution of the pressure field over a plurality of concentration points. While the embodiment of the connection element 5 with only one channel, as described in conjunction with FIG. 6, results in the formation of a highly concentrated medium or air flow onto a target area, the embodiment of the connection element 5 shown in FIG. 9 allows the medium or air flow to be distributed over a plurality of target areas. In this way, the flow can for example be blown against the clitoris 11 not just on its glans, but evenly from a plurality of sides. Depending on the application, this distribution of the air flow concentration to a plurality of areas can help to avoid overstimulation and/or help to increase the stimulation area.

FIGS. 10a to 10c show a fifth aspect of the invention with (partial) cross sections of a construction of the pressure field generating arrangement 2 with a bending element 64 as the drive for changing the volume in the first chamber 3. The bending element 64 can for example be a conventional piezoelectric bending element, which is deformed or bent once a voltage is applied. In this aspect of the invention, the wall 31 of the first chamber 3 takes a rigid or stiff form, while the bending element 64 is made to fit suitably against the sides of the first chamber 3. The transition points between the bending element 64 and the wall 31 are in this case sealed (resiliently joined by adhesion, for example). In this construction, the drive for the pressure field generating arrangement 2 is already integrated therein, and an external drive is not required. An electric motor with a cam is not needed, for example. This allows, inter alia, the reduction of any disruptive natural resonances due to movement of the cam of the stimulation device.

FIG. 10a shows in detail the pressure field generating arrangement 2 with the bending element 64 in a neutral

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position. Thus, the volume of the first chamber 3 with the bending element 64 in the neutral position is the standard volume. FIG. 10b furthermore shows the first chamber 3 with an excited and, consequently, outwardly bent bending element, for which reason the volume of the first chamber 3 has increased; consequently, a negative pressure prevails in the pressure field generating arrangement 2. FIG. 10c shows a bending element of the first chamber 3 excited in the opposite direction to FIG. 10b, for which reason the volume of the first chamber 3 has decreased; consequently, a positive pressure prevails in the pressure field generating arrangement 2.

FIG. 11 shows a second embodiment of the invention with a spatially separated arrangement of the chambers 3 and 4 of the pressure field generating arrangement 2. The chambers 3 and 4 are in this case connected via an extended connection element 5, which can be a relatively long flexible hose or a pipe, which may also be rigid. For example, the connection element 5 may be 0.5 m in length. This enables the housing 8 to be held in one hand while the other hand holds the second chamber 4 on the body part 11 to be stimulated; or the housing 8 may simply be laid aside, while the user holds only the second chamber 4 in both hands. Alternatively, the appendage 140 can be inserted into a body part, in which case it is no longer necessary for the stimulation device 1 to be held in the hand.

FIGS. 12a) to 12f) show various bottom and side views of further aspects of the second chamber 4 of the present invention. In detail, FIG. 12a) shows a bottom view of a circular second chamber 4 with a central opening 51; FIG. 12b) shows a bottom view of a triangular second chamber 4 with a central opening 51; FIG. 12c) shows a bottom view of an oval second chamber 4 with a central opening 51; and FIG. 12d) shows a bottom view of an approximately eight-shaped second chamber 4 with two openings 51 arranged offset from the center. FIG. 12e) furthermore shows a side cross section of a second chamber 4 according to the invention, wherein the second chamber 4 additionally has an extended contact surface 43 for the skin or a support part 43 to improve the sealing function of the second chamber 4 on the skin. The extended contact surface 43 may moreover have grooves or projections that improve the sealing function even further. FIG. 12f) shows a side cross section of a second chamber 4 having a plurality of separate connection elements 5 and an extended contact surface resulting from the support part 43.

The shape of the second chamber 4 can thus be fundamentally adjusted to the anatomy of the erogenous zone to be stimulated. The shape of the chamber 4 in FIG. 12a) is, for example, adjusted to the round shape of the breast, while the shape of chamber 4 in FIG. 12c) is better suited to the shape of the female vulva. Furthermore, the shape of the second chamber 4 also determines how pronounced the pressure field according to the invention is. The size of the second chamber 4 in relation to the volume displaced from the first chamber 3 thus determines the level of the achievable negative or positive pressure. Furthermore, the proximity of the opening 51 of the connection element 5 to the area of skin to be stimulated can also be used to determine the intensity of the massaging effect according to the invention on said area of skin. A plurality of openings 51, cf. FIG. 12d), allows the massaging effect to be distributed over a plurality of areas. Thus, for example, the clitoris can be stimulated less directly at the very sensitive clitoral glans (cf. FIG. 12e)) but more at the areas surrounding the clitoral glans, in order to prevent overstimulation of the clitoris.

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FIG. 13 shows a block diagram of an example of the functional construction of an embodiment of the present invention, having a control device 7, a drive unit 6, a light 9, an on/off switch 74, operating elements 71, a battery 76 and an external power supply 73.

The control device 7, which for example has a microcontroller or is hardwired, initially controls the power supply to all the consumers of the stimulation device 1 and optionally controls a process of charging and discharging the battery 76 and/or battery management. In particular, the control device 7 controls the excitation of the drive unit 6, such as the size of the deflection, the frequency, the modulation, etc.

Optionally provided operating elements 71 serve to set the mode of the device, i.e. to set the modulation pattern of the pressure field. The operating elements 71 may for example take the form of at least one push button, at least one rotary switch, or at least one touch-sensitive switch. Furthermore, the operating elements 71 may emit optical feedback for the purpose of confirmation, for example by means of light emitting diodes (LEDs) integrated in the switch.

An optional display 72 serves to inform the user of the device state and/or the set condition. The display 72 may for example take the form of a plurality of light emitting diodes or an LCD display. The displayed information may for example be the charging condition of an optional battery, or the current setting of the modulation pattern.

Furthermore, the control device 7 may have a memory in which at least one modulation or stimulation pattern (described in more detail in conjunction with FIGS. 14a) to d)) is stored. Excitation of the drive unit 6 can now be activated via the operating elements 71 in accordance with this previously stored stimulation pattern, depending on the choice made by the user of the stimulation device 1. The stimulation pattern of the pressure field can also be optionally and individually generated and stored by the user via the operating elements.

A socket (not shown in detail) can serve to supply external power to the stimulation device 1 via an external plug that is for example connected to an external mains adapter. In order to ensure that the stimulation device 1 is splash-proof, it is also possible, instead of the socket, to provide an electromagnetically inductive transformer that allows power to be supplied to the stimulation device 1 without an electrically conductive contact. Preferably, the stimulation device 1 moreover has a battery, for example a nickel metal hydride battery (NiMH), for wireless operation. Alternatively, a (relatively long) power supply cable may lead out of the stimulation device.

FIG. 14a) shows the sequence over time of overall pressure p in the pressure field generating arrangement (2) when the latter is used for stimulation. The broken line indicates the reference pressure, for example the currently prevailing atmospheric pressure, outside the pressure field generating arrangement (2). If the second chamber 4 is now placed on the body part 11 to be stimulated, the initially prevailing ambient pressure remains approximately constant in the pressure field generating arrangement (2). It is assumed that the second chamber 4 is placed on the body part to be stimulated such that it is largely air-tight. Once the stimulation device is activated, the drive unit 6 is activated or excited by the control device 7 in accordance with a previously stored stimulation pattern. Accordingly, the volume of the first chamber 3 and thus the overall pressure in the pressure field generating arrangement 2 are changed, with the changes in pressure being modulated onto the reference pressure. The pressure or stimulation pattern shown as an example in FIG. 14a) develops a pulsed, regular

pressure field. In phases of pressure increase, air is blown against or massages the erogenous zone to be stimulated, whereas at times when a negative pressure prevails the blood circulation in the body part 11, for example the clitoris, is favored. Thus, there are time periods according to the invention (designated in FIG. 14a) as I)) in which a negative pressure prevails while the clitoris is simultaneously being indirectly massaged.

FIG. 14b) shows three examples of alternative stimulation patterns. Thus, the area designated as II) shows a pulsed stimulation pattern of high amplitude. The area designated as III) shows a pulsed stimulation pattern of low amplitude. Furthermore, the area designated as IV) illustrates a stimulation pattern which is irregular as regards sequence over time and asymmetrical in amplitude. The patterns can be varied, depending on the effect on the body/application and in accordance with the wishes of the individual.

FIG. 14c) shows a further example of an alternative stimulation pattern. Here, the intensity of the pressure may increase with time in order to adjust to the user's state of excitement.

In addition to the embodiments that have been explained, the invention allows for further constructional principles. For example, different arrangements or constructions of the first chamber 3 may be combined as desired with different embodiments of the second chamber 5 or the connection element 5. For example, the first chamber 3 having the drive in FIG. 10 can be combined with the second chamber in FIG. 12f).

Although only one first chamber 3 is shown in all embodiments, two or more first chambers 3 may also be provided, which are then driven accordingly simultaneously or with a time delay such that their volume is changed in order to build up a pressure field according to the invention.

Although only one opening from the first chamber 3 to the connection element 5 is shown in all embodiments, a plurality of openings for a connection element 5 or indeed a plurality of openings for a plurality of connection elements 5 may also be provided in the first chamber 3.

A stimulation device 1 can have a plurality of pressure field generating arrangements 2. Thus, for example, two pressure field generating arrangements may be provided in order to stimulate two erogenous zones simultaneously.

The stimulation patterns according to the invention can differ from the patterns shows in FIGS. 14a), b) and c), provided they have a sequence of positive and negative pressures over time. For example, a relatively long-lasting negative pressure can initially be built up at the beginning or after activation of the device (for example 3 minutes), in order to effectively increase the blood circulation in the zone to be stimulated, after which pulses of negative and positive pressures of slowly increasing amplitude follow.

LIST OF REFERENCE NUMERALS

- 1 Stimulation device
- 2 Pressure field generating arrangement
- 3 First chamber
- 4 Second chamber
- 5 Connection element
- 6 Drive unit
- 7 Control device
- 8 Housing
- 9 Light
- 11 Body part
- 12 Clitoris
- 31 Wall of the first chamber

- 32 Holder
- 41 Wall of the second chamber
- 42 Opening of the first chamber
- 43 Contact surface
- 51 Opening from the connection element to the second chamber
- 61 Drive shaft
- 62 Cam
- 63 Piston
- 64 Bending element
- 71 Operating element
- 72 Display
- 73 Power supply
- 74 On/off switch
- 76 Battery
- 77 Control board
- 140 Appendage
- 141 Joint
- 142 Vibration device

The invention claimed is:

1. A stimulation device for erogenous zones, comprising: at least one pressure field generating arrangement with: at least one first chamber; at least one second chamber having at least one opening for placing on a body part; and at least one connection element that connects the at least one first chamber to the at least one second chamber;

a drive unit that varies the volume of the at least one first chamber such that a stimulating pressure field is generated via the at least one connection element in the at least one second chamber;

a control device that activates the drive unit; and an appendage;

wherein the stimulating pressure field generated in the at least one second chamber comprises a pattern of negative and positive pressures, modulated onto with respect to a reference pressure;

wherein the at least one first chamber is connected to the at least one second chamber solely by the at least one connection element, and

wherein the appendage is a dildo configured to be inserted into a vagina.

2. The stimulation device as claimed in claim 1, wherein at least one opening of the at least one connection element is opposite the body part to be stimulated and is directed towards the body part to be stimulated.

3. The stimulation device as claimed in claim 1, wherein the at least one second chamber is at least one of: a flexible material, a transparent material, or fitted to the shape of a vaginal labia minora such that the vaginal labia minora is completely covered by the opening of the at least one second chamber.

4. The stimulation device as claimed in claim 1, wherein the at least one second chamber is made in one piece with the at least one connection element and the at least one first chamber.

5. The stimulation device as claimed in claim 1, wherein the at least one second chamber of the stimulation device is arranged to be replaceable.

6. The stimulation device as claimed in claim 1, wherein the at least one second chamber is arranged separately from the stimulation device; and the at least one connection element is a hose or tube.

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7. The stimulation device as claimed in claim 1, wherein the at least one second chamber has a sealing support part for enlarging a contact surface of the at least one second chamber on skin.
8. The stimulation device as claimed in claim 1, wherein the respective modulation of the stimulating pressure field may be changed by means of an operating element.
9. The stimulation device as claimed in claim 1, wherein the stimulation device has a light for lighting the at least one second chamber.
10. The stimulation device as claimed in claim 1, wherein the at least one connection element has an internal shape and an opening to the at least one second chamber that provide a form such that the stimulating pressure field is modulated in direction and intensity.
11. The stimulation device as claimed in claim 1, wherein the stimulation device is a hand-held device.
12. The stimulation device as claimed in claim 1, wherein the appendage is mounted on a housing to be movable.
13. The stimulation device as claimed in claim 1, wherein the appendage is connected to a section of a housing that accommodates the at least one pressure field generating arrangement via a joint.
14. The stimulation device as claimed in claim 1, wherein the appendage is a stimulation aid for insertion into a human body.
15. The stimulation device as claimed in claim 1, wherein the appendage has a vibration device.
16. The stimulation device as claimed in claim 1, wherein the appendage is mounted on a section of a housing that accommodates the at least one pressure field generating arrangement such that the housing of the stimulation device is unitary in form.
17. The stimulation device as claimed in claim 1, wherein the stimulation device is configured in size, movability and shape to fit a female anatomy such that the at least one pressure field generating arrangement is configured to indirectly stimulate a clitoris of a woman while the appendage is configured to simultaneously be inserted into a vagina of the woman.
18. The stimulation device as claimed in claim 1, wherein the appendage is a handle for holding the stimulation device.
19. The stimulation device as claimed in claim 1, wherein the appendage is an elongate lens-shaped body configured to be inserted into the vagina.
20. A system comprising:
a stimulation device comprising:
at least one pressure field generating arrangement with:
at least one first chamber;
at least one second chamber having at least one opening for placing on a body part; and

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- at least one connection element that connects the at least one first chamber to the at least one second chamber;
- a drive unit that varies the volume of the at least one first chamber such that a stimulating pressure field is generated via the at least one connection element in the at least one second chamber;
- a control device that activates the drive unit; and
an appendage; and
- a remote control device, arranged separately from the stimulation device, for remotely controlling the stimulation device;
- wherein the stimulating pressure field generated in the at least one second chamber comprises a pattern of negative and positive pressures, modulated with respect to a reference pressure;
- wherein the at least one first chamber is connected to the at least one second chamber solely by the at least one connection element; and
- wherein the appendage is a dildo configured to be inserted into a vagina.
21. A method for stimulating erogenous zones for sexual pleasure, comprising:
inserting an appendage of a stimulation device into a vagina;
forming, by a pressure field generating arrangement of the stimulation device, a pressure field directed towards a body part; and
modulating, by a drive unit of the stimulation device interacting with the pressure field generating arrangement, the pressure field in a pattern of negative and positive pressures with respect to a reference pressure.
22. The method for stimulating erogenous zones as claimed in claim 21, wherein
a stimulation effect is individually influenced by modulating the pressure field by means of an operating element.
23. The method for stimulating erogenous zones as claimed in claim 21, wherein
the modulating is pulsed.
24. The method for stimulating erogenous zones as claimed in claim 21, further comprising:
placing a chamber of the pressure field generating arrangement over the body part.
25. The method for stimulating erogenous zones as claimed in claim 21, wherein
the appendage vibrates after insertion.
26. The method for stimulating erogenous zones as claimed in claim 21, wherein the body part is a clitoris.

* * * * *

Exhibit 3



US009937097B2

(12) **United States Patent**
Lenke

(10) **Patent No.:** **US 9,937,097 B2**
(45) **Date of Patent:** ***Apr. 10, 2018**

(54) **STIMULATION DEVICE HAVING AN APPENDAGE**

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(72) Inventor: **Michael Lenke**, Metten (DE)

(73) Assignee: **NOVOLUTO GMBH**, Metten (DE)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **15/487,123**

(22) Filed: **Apr. 13, 2017**

(65) **Prior Publication Data**

US 2017/0216135 A1 Aug. 3, 2017

Related U.S. Application Data

(63) Continuation of application No. 15/302,981, filed as application No. PCT/EP2015/067017 on Jul. 24, 2015.

(30) **Foreign Application Priority Data**

Mar. 13, 2015 (DE) 10 2015 103 694

(51) **Int. Cl.**
A61F 5/00 (2006.01)
A61H 19/00 (2006.01)

(Continued)

(52) **U.S. Cl.**
CPC **A61H 19/34** (2013.01); **A61H 9/0057** (2013.01); **A61H 19/44** (2013.01); **A61H 23/02** (2013.01);

(Continued)

(58) **Field of Classification Search**
CPC A61H 19/00; A61H 19/30; A61H 19/34; A61H 19/40; A61H 19/44; A61H 23/00; A61H 9/0057

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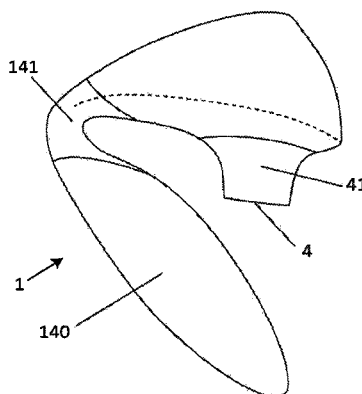
Primary Examiner — John Lacyk

(74) *Attorney, Agent, or Firm* — Chiesa Shahinian & Giantomasi PC

(57) **ABSTRACT**

A stimulation device is provided in accordance with one embodiment. The stimulation device includes a chamber which has a flexible wall portion. A drive unit of the stimulation device is in physical communication with the flexible wall portion so as to cause deflections of the flexible wall portion in opposing directions, thereby resulting in a changing volume of the chamber. The changing volume of the chamber results in modulated positive and negative pressures with respect to a reference pressure. An opening of the stimulation device is for applying the modulated positive and negative pressures to a body part. An appendage of the stimulation device may be used as a handle to allow a user to position the stimulation device over the body part. The stimulation device includes a control device for controlling the drive unit.

30 Claims, 7 Drawing Sheets



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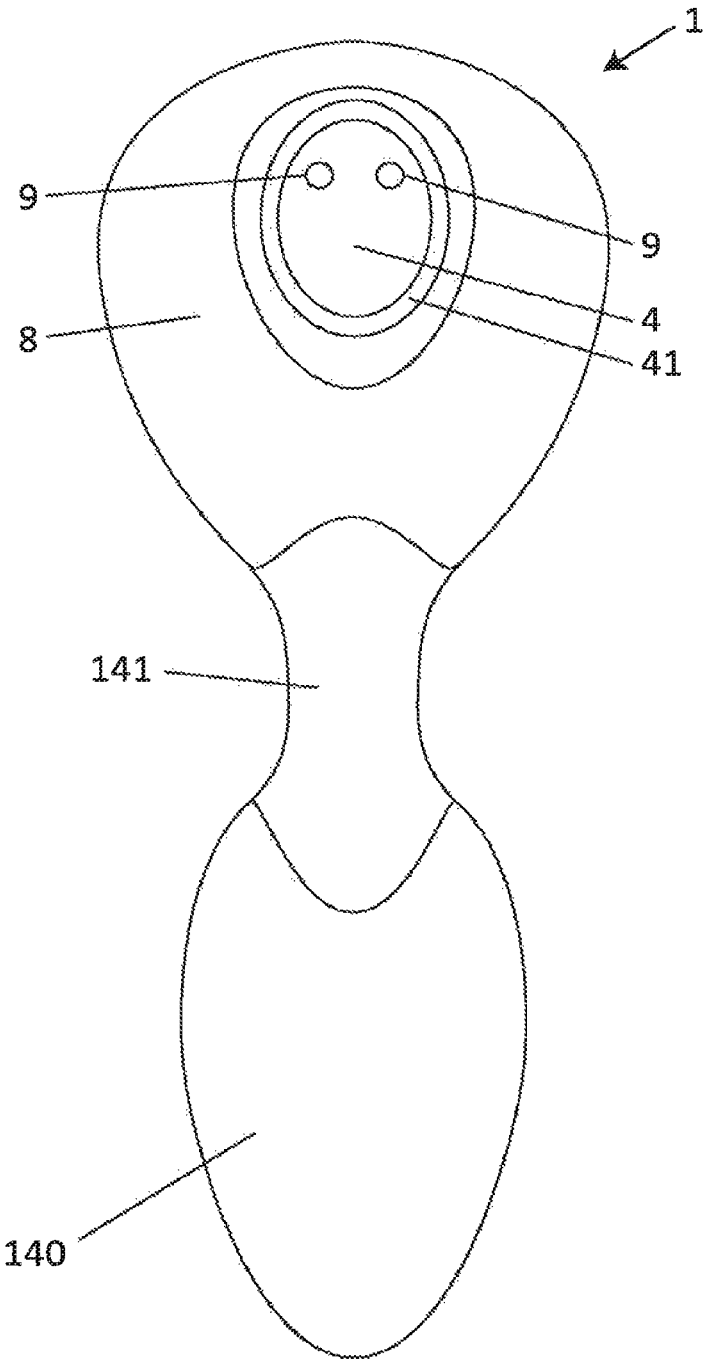
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Fig. 1



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Fig. 2

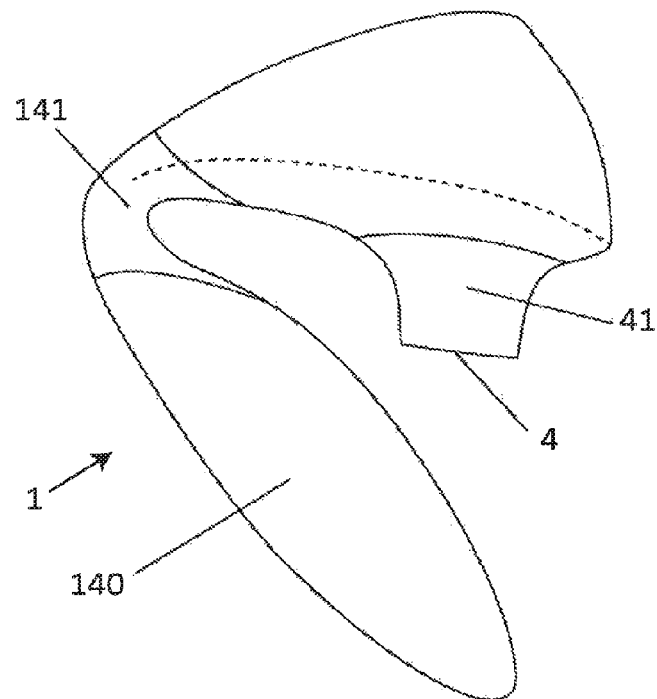


Fig. 3

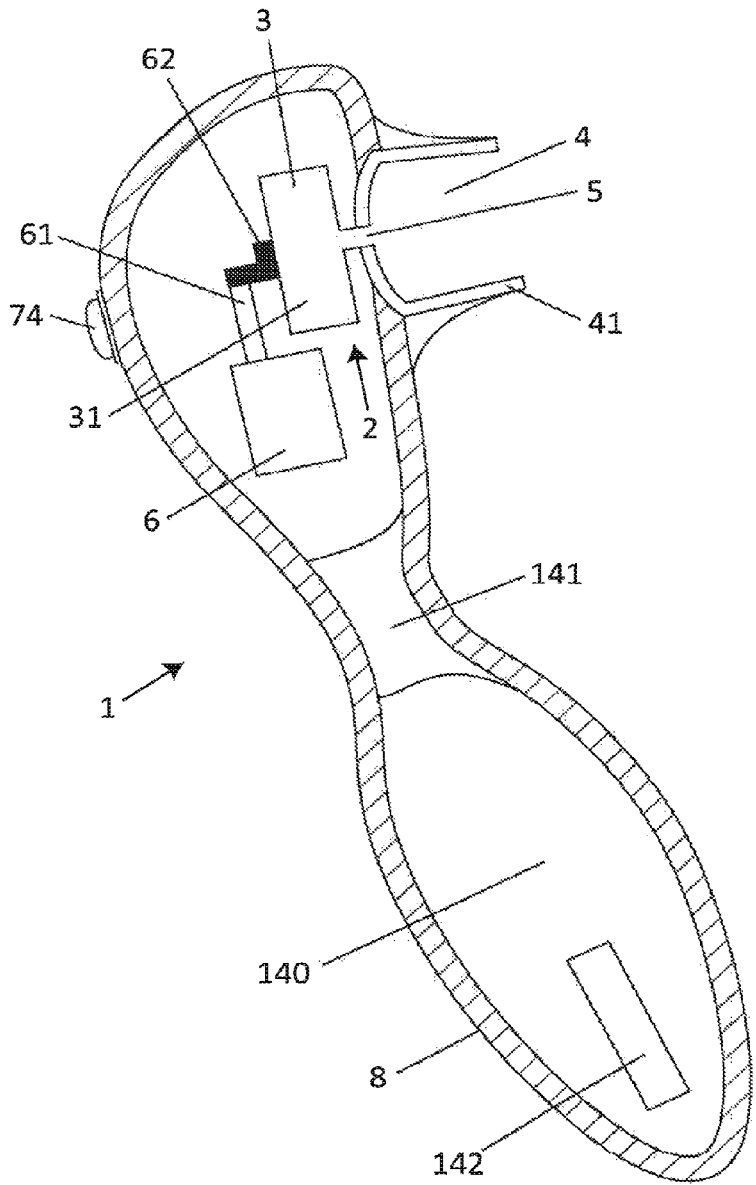


Fig. 4

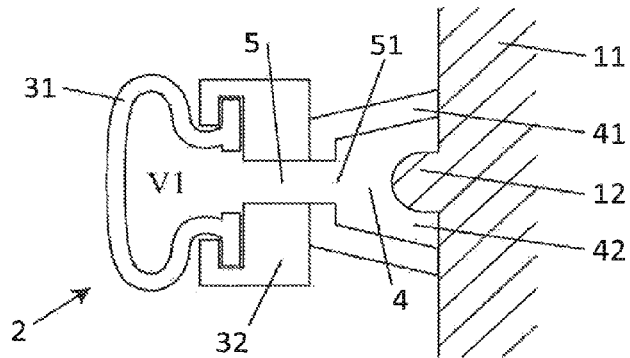


Fig. 5

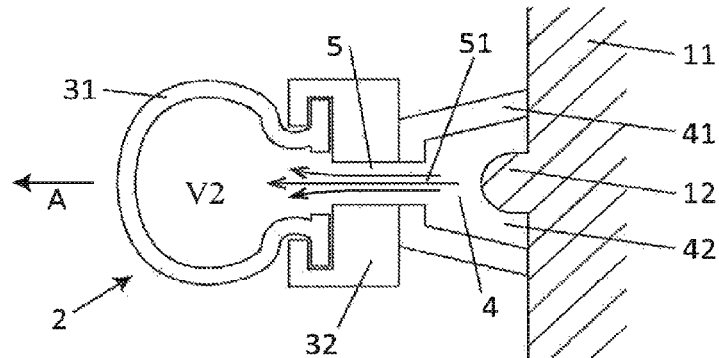


Fig. 6

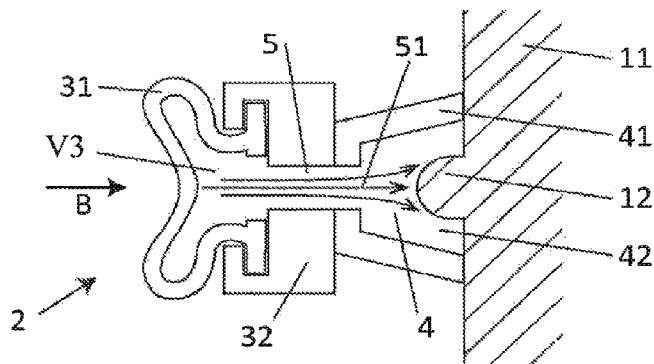


Fig. 7

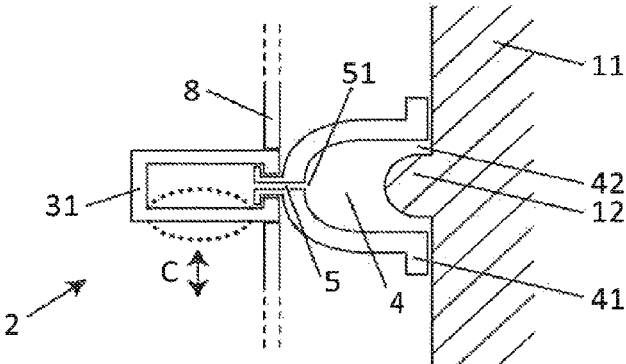


Fig. 8

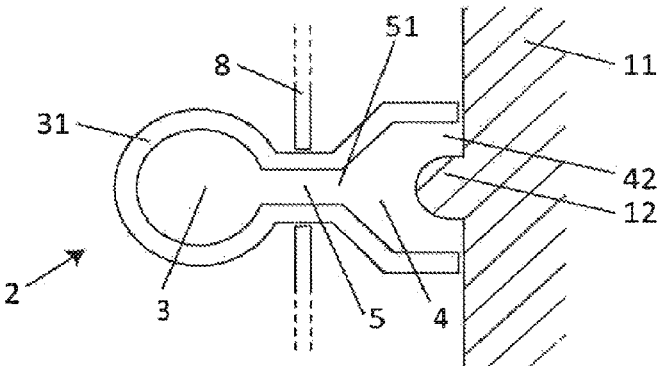


Fig. 9

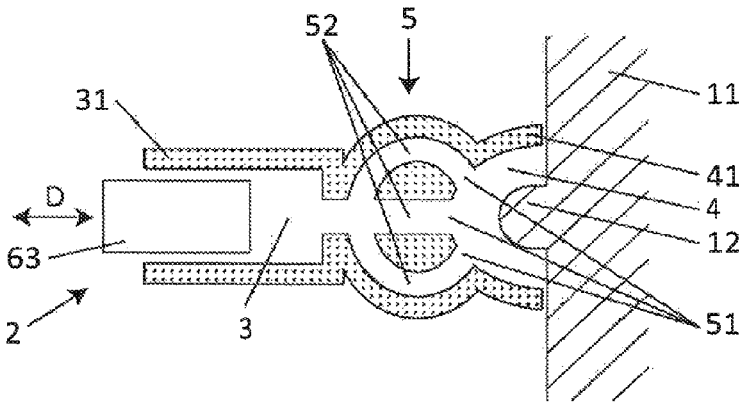


Fig. 10a

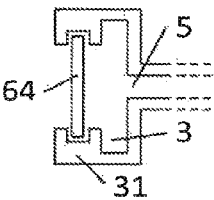


Fig. 10b

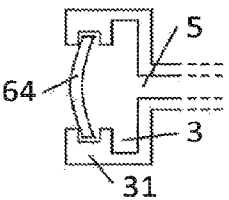


Fig. 10c

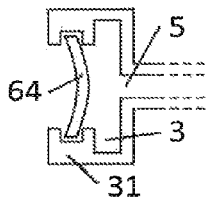


Fig. 11

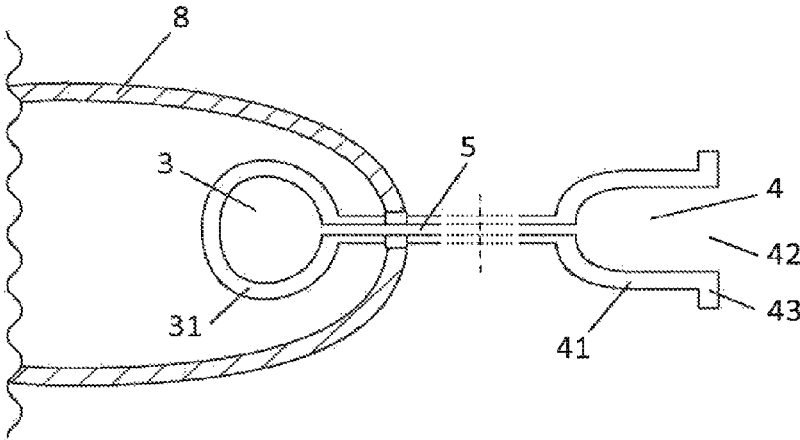


Fig. 12a

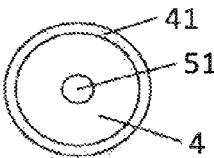


Fig. 12b

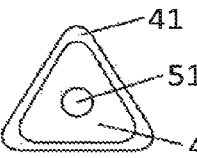


Fig. 12c

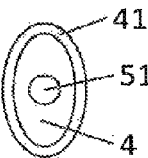


Fig. 12d

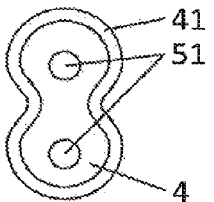


Fig. 12e

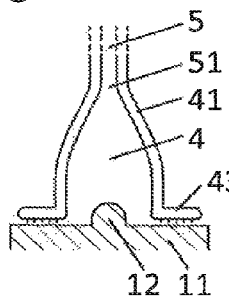


Fig. 12f

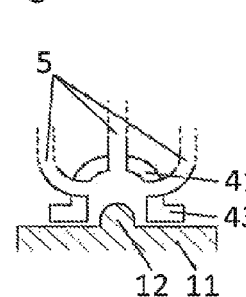


Fig. 13

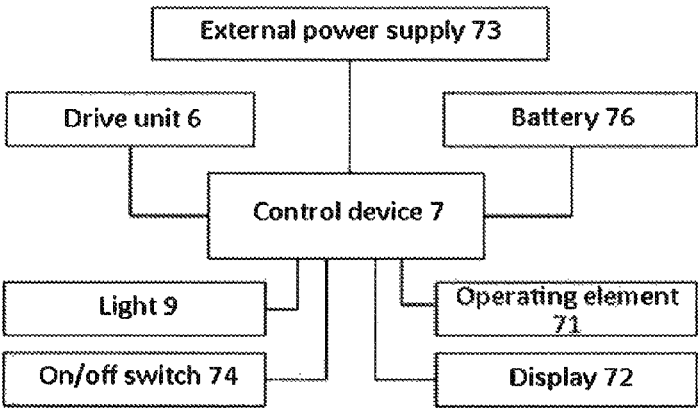


Fig. 14a

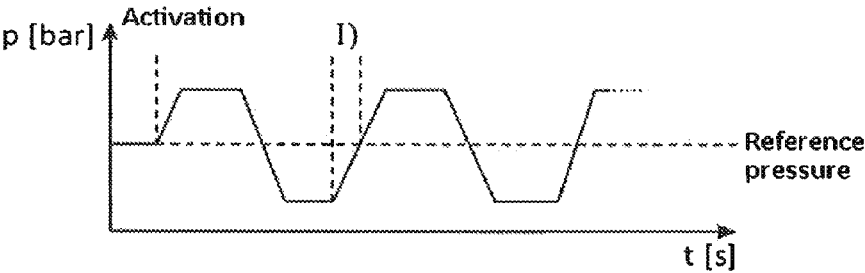


Fig. 14b

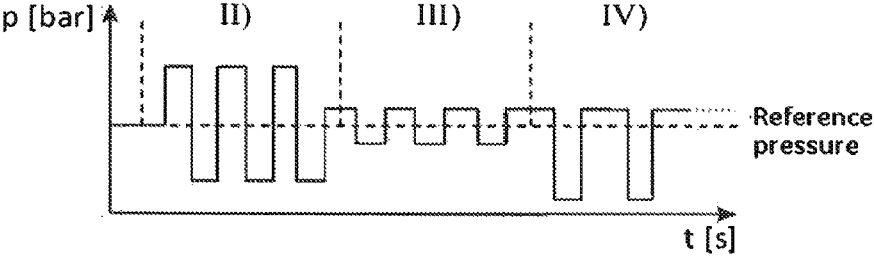
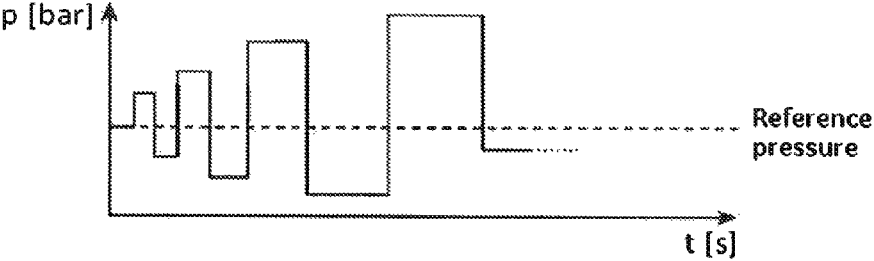


Fig. 14c



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STIMULATION DEVICE HAVING AN APPENDAGE

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. patent application Ser. No. 15/302,981, filed Oct. 7, 2016, which is a national stage (under 35 U.S.C. 371) of International Patent Application No. PCT/EP2015/67017, filed Jul. 24, 2015, which claims priority to German Patent Application No. 102015103694.0, filed Mar. 13, 2015, the disclosures of which are herein incorporated by reference in their entirety.

TECHNICAL FIELD

The present invention relates to a stimulation device having an appendage for erogenous zones, in particular for the clitoris, a system with a stimulation device, and methods for stimulating body parts.

BACKGROUND

The erogenous zones of the human body can be stimulated with a variety of aids. For example, vibrators are used to apply a stimulus to a particular area of the skin by direct contact. These include stimulation aids for insertion into the human body, such as dildos.

Direct stimulation of the clitoris, for example using a clitoral massage vibrator, is frequently problematic. The clitoris is usually a woman's most sensitive erogenous zone. The entire clitoris is highly innervated, making it particularly touch-sensitive and responsive to sexual stimuli. In this context, the clitoral glans, in which the nerve cords of the two crura meet, should be emphasized in particular. Thus, on the one hand frequent application of a clitoral massage vibrator for direct stimulation leads to habituation effects or conditioning of the stimulated erogenous zone, while on the other the first applications of such a device may require certain practice or familiarization. Moreover, indirect stimulation of the female erogenous zones may be insufficient, or it may be desired to intensify the stimulation effect.

Furthermore, medical studies conducted in 2006 identified the female clitoris as the definitive starting point of the female climax, and for the first time neurologically proved the different qualities of sensation of clitoral and vaginal orgasm. Thus, both the clitoris and the vagina are capable of orgasm.

Furthermore, the sensitivity of the human erogenous zones, such as the clitoris, the inner and outer labia or the nipples, differs greatly from one individual to the next. Moreover, the sensitivity of the corresponding zone can change dramatically from one situation to another or even during a sexual act. Furthermore, a rapid and pronounced stimulation of different erogenous zones is frequently desired.

Various direct and indirect forms of stimulation are usual practice, for example vacuum pumps and dildos.

For indirect stimulation of erogenous zones, and particularly the clitoris, conventional vacuum devices are used to stimulate the erogenous zones of the person concerned without directly contacting the main area to be stimulated. Thus, for example, vacuum pumps for the primary or secondary female sexual organs are known, which usually have a suction cup for placing on the appropriate area and a hand pump. The negative pressure exerted by this type of device on the clitoris, for example, generates a negative

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pressure in the clitoris itself which is usually below the systolic blood pressure. This difference in pressure results in an enlargement of the clitoris and/or stimulates the blood flow in the affected area. This vascular clitoral engorgement serves both to promote desire by increasing sensitivity and for visual and tactile manipulation. The improved blood circulation also results in an increased secretion of vaginal moisture, which makes the stimulation more pleasurable. However, the manual operation of the hand pump is often onerous or irksome. In addition, the long-term or uninterrupted application of negative pressure with this device category too may result in habituation effects, which limit the effectiveness of the device in the long term.

Electrically driven vacuum pumps are also increasingly used instead of a manually operated vacuum pump. As an example of this, WO 2006/05 82 91 A2 discloses a device for sexual therapy, wherein the arrangement comprises a tubular suction chamber for the clitoris, an electrical vacuum source (vacuum pump) and a plurality of air flow openings. Operation of the vacuum pump generates an ongoing air flow or air exchange in the chamber, in the area of the clitoris. This has the disadvantageous effect of drawing off by suction the vaginal moisture, which is increased as a result of the negative pressure, thus having a drying effect on the stimulated skin parts. Likewise, the drawn-off moist air results in contamination of the fluidically downstream vacuum arrangement, for example the vacuum pump. Such arrangements with vacuum pumps may thus be problematic from the point of view of hygiene, as vacuum pumps and the associated valves or ventilation components often have dead spaces and/or are difficult to clean. Furthermore, the device serves to treat the blood vessels in the clitoris and not to provide stimulation up to sexual climax.

U.S. Pat. No. 6,464,653 B1 discloses therapeutic devices and methods that generate a clitoral engorgement with the aid of a vacuum generated by a vacuum pump to assist in the treatment of clitoral disorders such as incontinence. A control valve or modulator that can be appropriately covered by a finger is used to manually adjust or vary the level of vacuum in the suction chamber. This requires the user's attention and may be irksome or distracting under certain circumstances. This relatively complex device having further valves also has the disadvantages relating to hygiene and dehydration that were mentioned above, with the device moreover serving for long-term therapeutic purposes and not for short-term sexual stimulation.

Thus, the devices of the prior art have the common disadvantage that the complexity of the arrangements generating negative pressure or positive pressure may be high and this device may have problems in respect of hygiene. Moreover, there is a problem of ease of handling the devices, which are frequently uncomfortable to hold and/or require habituation.

Furthermore, the devices of the prior art have the further common disadvantage in that habituation effects occur in the event of long-term, continuous or frequently recurring application of negative pressures.

Another disadvantage of some of the previously described vacuum devices is, firstly, that the negative pressure has to be limited by means of a control valve or a vacuum pump and, secondly, that the negative pressure is supposed to be relieved by means of manually opening a release valve before the suction cup is detached from the skin. Should one of the valves have a technical defect and/or the user operate the device incorrectly, there is a risk of injury in certain circumstances.

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Thus, in view of the problems mentioned above, one object of the embodiments described herein is to provide a stimulation device that has a simple construction, is easy and safe to use, and has a pronounced stimulation effect.

This object is achieved by the stimulation device as described herein. Advantageous developments and embodiments are also described herein.

SUMMARY

A stimulation device is provided in accordance with one embodiment. The stimulation device includes a chamber which has a flexible wall portion. In one embodiment, the flexible wall portion may include silicon and may be integral with the chamber. A drive unit of the stimulation device is in physical communication with the flexible wall portion so as to cause deflections of the flexible wall portion in opposing directions, thereby resulting in a changing volume of the chamber. The changing volume of the chamber results in modulated positive and negative pressures with respect to a reference pressure. The modulated positive and negative pressures are applied to a body part (e.g., a clitoris) through an opening of the stimulation device. For example, the opening of the stimulation device may be placed over the body part to apply the modulated positive and negative pressures. The stimulation device may include an appendage, which can be used as a handle to allow a user to hold and position the stimulation device over the body part. The drive unit is controlled by a control device of the stimulation device.

In one embodiment, the stimulation device includes a second chamber. The changing volume of the chamber results in the modulated positive and negative pressures in the second chamber.

In one embodiment, the stimulation device is rigid such that the stimulation device does not significantly bend. The stimulation device may be a portable, hand-held, battery powered device. The stimulation device may also have an operating element for adjusting the modulated positive and negative pressures and a light emitting diode for indicating a status of the stimulation device.

In accordance with an embodiment, the stimulation device includes a pressure field generator which has a flexible wall portion. A drive unit of the stimulation device is in physical communication with the flexible wall portion so as to cause deflections of the flexible wall portion in opposing directions, thereby resulting in a changing volume of the pressure field generator. The changing volume of the pressure field generator results in modulated positive and negative pressures with respect to a reference pressure. The modulated positive and negative pressures are applied to a body part through an opening of the stimulation device. The stimulation device may include an appendage, which can be used as a handle to allow a user to hold and position the stimulation device over the body part. The drive unit is controlled by a control device of the stimulation device.

In one embodiment, the pressure field generator includes a first chamber and a second chamber. As such, deflections in the flexible wall portion of the first chamber of the pressure field generator result in the modulated positive and negative pressures in the second chamber of the pressure field generator.

The above-described features and functions of the present invention, and further aspects and features, are further

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described below with the aid of a detailed description of preferred embodiments with reference to the attached illustrations.

BRIEF DESCRIPTION OF THE DRAWINGS

In the figures:

FIG. 1 shows a front view of a first embodiment of the stimulation device according to the invention, with an appendage in a straight position;

FIG. 2 shows a side view of the first embodiment of the stimulation device according to the invention, with the appendage in an angled position;

FIG. 3 shows a schematic cross section through the first embodiment of the stimulation device according to the invention;

FIG. 4 shows a cross section through a pressure field generating arrangement of a first aspect of the present invention, in the first state;

FIG. 5 shows a cross section through a pressure field generating arrangement of a first aspect of the present invention, in the second state;

FIG. 6 shows a cross section through a pressure field generating arrangement of a first aspect of the present invention, in the third state;

FIG. 7 shows a cross section through a pressure field generating arrangement of a second aspect of the present invention;

FIG. 8 shows a cross section through a pressure field generating arrangement of a third aspect of the present invention;

FIG. 9 shows a cross section through a pressure field generating arrangement of a fourth aspect of the present invention;

FIGS. 10 a), b) and c) show cross sections through a pressure field generating arrangement of a fifth aspect of the present invention;

FIG. 11 shows a partial cross section through a second embodiment of the stimulation device according to the invention;

FIGS. 12 a) to f) show various bottom and side views of further aspects of a second chamber of the present invention;

FIG. 13 shows a block diagram of an embodiment of the present invention; and

FIGS. 14 a) to c) show graphs of various pressure modulation patterns of the present invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

According to one embodiment, a pressure field generating arrangement of the stimulation device has at least one first chamber and at least one second chamber having at least one opening for placing on a body part or on the erogenous zone and at least one connection element that connects the first chamber to the second chamber.

In one embodiment the chambers are in fluidic communication via the at least one connection element to allow the simple generation of a pressure field in the second chamber by changing the volume in the first chamber and temporarily direct the generated pressure field to the area of skin to be stimulated.

A pressure field, in the context of the embodiments described herein, is a field of medium pressures that is variable over time and has temporary positive pressures and temporary negative pressures, a negative pressure being a pressure of medium that is below the reference pressure and

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a positive pressure being a pressure of medium that is above the reference pressure. As a result, the medium flows back and forth in the pressure field. Thus, preferably a (largely) intermittent exchange of said medium can occur.

The medium is usually gaseous, preferably air, but may for example alternatively or in addition be a liquid medium, such as water or commercially available lubricant. For example, the chambers may be filled with the lubricant prior to using the stimulation device. This also allows the corresponding area of skin to be stimulated with a suitable skin-friendly liquid instead of air, which may be desired, depending on the user's individual preference. As a further example, the stimulation device may also be used under water with water as the medium (in the bathtub, for example). In this case the stimulation device is waterproof in form.

The reference pressure is usually the atmospheric pressure acting on the stimulation device that prevails when application begins (i.e. prior to placing the stimulation device on the area of skin to be stimulated). In the preferred application of the stimulation device with air, the reference pressure is the currently prevailing air pressure or normal pressure. For example, when the device is applied under the normal standard conditions the reference pressure may be approximately 1 bar, from which it follows that a negative pressure may be for example 0.7 bar and a positive pressure may be for example 1.3 bar.

The pressure field according to one embodiment is used on the one hand to excite blood circulation of the area of skin to be stimulated, while on the other said area of skin is indirectly massaged. This combines two advantageous effects. The increased blood circulation makes the erogenous zone of the person concerned more sensitive, while moreover generating a massaging effect that serves to stimulate the erogenous zone, for example for sexual arousal up to climax. The massaging effect is generated by the kinetic energy of the medium flowing out of the first chamber through the connection element against the surface of the area of skin to be stimulated. In this way, the massaging effect created by the pressure field is generated indirectly, i.e. without the skin part to be stimulated being in direct contact with a solid body such as a vibrator.

By the exemplary application to the clitoris of the pressure field which is variable over time according to one embodiment, the pressure field imitates a stimulation that usually occurs during sexual intercourse. Likewise, the motion of congress during this generates a varying stimulus of the clitoris. It is thus a lifelike simulation of the natural act of congress, with medical findings confirming that application of the pressure field causes neither habituation effects nor addiction. This is due in particular to the alternating application of negative and positive pressures (or indeed to the non-continuous application of only one type of pressure).

Furthermore, the maximum applicable pressure is typically limited by the maximum load that may be put on the area of skin to be stimulated. Thus, for instance, too high a negative pressure harbors the risk of painful injury, in particular in erogenous zones. Stimulation devices working only with negative pressures are usually limited to this maximum in their mode of operation. By contrast, according to the embodiments described herein, the combination of positive and negative pressures creates an extended operational range of the stimulation-triggering pressure field or effect, as the operational range of the pressure can now be exploited to the maximum in both the positive and the negative range.

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The orientation of the at least one connection element towards the area of skin to be stimulated allows the pressure field to work directly, the pressure field being decisively affected by the configuration of the at least one connection element and the at least one opening from the connection element into the second chamber, and is thus adjustable depending on the application of the stimulation device. Thus, the at least one opening of the connection element may be located opposite, preferably directly opposite, the body part to be stimulated. For example, the connection element in a stimulation device intended for the clitoris may have, between the first and second chamber, a single passage opening having a nozzle effect on the clitoral glans. Alternatively, the at least one connection element may comprise a plurality of passage openings, for example four, between the chambers if a relatively large area of skin is to be stimulated.

Furthermore, after placing the halfway or partially opened second chamber on the area of skin to be stimulated, a closed system of medium or air flow is created in the pressure field generating arrangement. Thus, the medium or air is moved decisively back and forth between the chambers, while an exchange with medium or air from outside the system is at least largely avoided. Thus, the first chamber is preferably connected exclusively to the second chamber via or through the connection element. Thus, the first chamber has no connections other than those to the second chamber; for example, there is no direct connection between the first chamber and the environment surrounding the device via a pressure valve or an air discharge channel.

For example, the temperature of the air in the flow system according to one embodiment rapidly adjusts to skin temperature, while the irksome supply of new (possibly cold) air from outside the system, as may be the case when using vacuum pumps of the prior art inter alia, is avoided. Drying effects are moreover avoided, as very little or no removal of stimulation-promoting fluid, such as bodily fluid, occurs in a closed system.

Furthermore, due to the simple construction, the pressure field generating arrangement according to one embodiment has the advantage of better hygiene and improved cleaning capacity. Here, the pressure field generating arrangement avoids valves or pumps/compressors with potential dead spaces and places that cannot be cleaned. The pressure field generating arrangement is thus easy to clean. For example, the stimulation device can be cleaned in a simple manner by filling the first chamber with a cleaning agent and activating the pressure field. Alternatively, the second chamber can be arranged to be replaceable, which also simplifies the cleaning of both chambers. Furthermore, the chambers and the connection element of the pressure field generating arrangement can be manufactured in one piece, wherein they are made for example of a single plastic molded part (e.g. rubber). As a further alternative, the first chamber, the second chamber and the connection element may be made in one piece.

Moreover, the construction according to one embodiment has the result of avoiding complex fluid engineering elements such as valves, which results in simplified manufacture.

Furthermore, the stimulation device according to one embodiment has a drive unit that varies the volume of the first chamber such that a pressure field is generated via the connection element in the second chamber, this pressure field serving to stimulate the erogenous zone, and a control device that activates the drive unit.

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The principle of the embodiments described herein means that the medium transported between the chambers is limited in volume to the maximum volume of the first chamber. Moreover, the transported volume can be further limited, as a result of its construction, by the maximum possible change in volume brought about by the drive unit.

Consequently, the maximum positive or negative pressure the stimulation device can build up in the second chamber is limited due to the dimensions of the components of the pressure field generating arrangement and the drive. In particular, the maximum positive or negative pressure can be limited to an amount that minimizes or rules out any risk of injury for the areas of skin to be stimulated. As a result, a safety valve that is usual in the prior art, or a manual intervention in the stimulation process by the user, such as the opening of a release valve, is for example rendered unnecessary.

Furthermore, the variation over time in the pressure field or the modulation of the pressure field by the control device is controlled largely automatically. Thus, the modulation of the pressure field, such as intensity, time profile or sequence, can be previously stored in the control device. Preferably, the variation over time in the pressure field can have a regular or recurring (stimulation) pattern, such as pulses at a predetermined cycle rate or regularly alternating pulse sequences. This allows the user's interaction with the stimulation device to be limited to switching on and off and selecting the stimulation pattern, while the stimulation device automatically executes the preferred stimulation pattern. Thus, the complexity of using the stimulation device is low, particularly when compared with conventional (medical) vacuum stimulation devices. Alternatively or in addition, the stimulation pattern of the stimulation device can be individually configured by the user during or before operation.

Moreover, according to one embodiment, the stimulation device is provided with (at least) one appendage. On the one hand this appendage may be used as a handle in order to hold the stimulation device easily and comfortably, and on the other the appendage may also be used as a direct stimulation aid for insertion into the human body or indeed for placing on the human body.

If the appendage is inserted into the human body, it serves for direct stimulation of the body part concerned. Thus, it supplements the indirect stimulation effect of the pressure field generating arrangement. It is thus possible for a direct and an indirect stimulation of a plurality of erogenous zones to occur simultaneously or alternately. For example, the appendage may be inserted into the female vagina, while stimulation of the clitoris may take place at the same time or alternately by means of the pressure field according to one embodiment. Accordingly, the principle of the combined direct and indirect stimulation may also be applied to other body parts, or the erogenous zones thereof. For example, the appendage may be placed on a woman's clitoris while the pressure field generating arrangement stimulates another woman's or the same woman's clitoris.

In this way, the stimulation device having an appendage may be used by only one person or indeed by two different people for the stimulation of a plurality of erogenous zones.

The combination of direct and indirect stimulation results in an improvement in the stimulation effect and a versatile applicability of the stimulation device. Moreover, further, alternative types of play during the sexual act are possible using the inventive stimulation device having an appendage.

Thus, according to one embodiment, a stimulation device which has a plurality of cumulative orgasm- or stimulation-

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triggering effects and is suitable for the stimulation of a plurality of erogenous zones, in particular the female clitoris, is provided. Furthermore, a device is provided which avoids dehydration of the erogenous zones to be stimulated, is hygienic and avoids habituation effects.

According to one embodiment, the appendage is movable with the pressure field generating arrangement, for example being connected by means of a joint at one end of the appendage. In this way, the stimulation device may be adapted to the anatomy of the human body in question and to its use. For example, the appendage may be inserted into the female vagina in order then to adapt the angle between the pressure field generating arrangement and the appendage such that the opening of the second chamber can be placed precisely over the clitoris. Consequently, the area of the body between the clitoris and the vagina is stimulated from both sides, mutually enhancing the effects of direct and indirect stimulation.

If the appendage is used as a handle for holding the stimulation device, the angle between the handle and the opening of the second chamber can be adapted to suit the preferences of the user of the device.

According to one embodiment, the appendage is a stimulation aid which is shaped such that the appendage can be inserted into the human body, for example the vagina, for direct stimulation. In this case, the appendage preferably takes the form of a dildo. Here, sharp corners in particular are avoided. Thus, the appendage is preferably in a form such that it can be inserted smoothly into body cavities and/or also remain inserted therein.

According to one embodiment, the appendage is an elongate, lens-shaped or pillow-shaped body which is adapted such that the appendage can be inserted smoothly into the female vagina. This improves the direct stimulation effect.

According to one embodiment, the appendage is mounted on the pressure field generating arrangement such that the stimulation device is unitary in form. Here, unitary means in particular that the stimulation device having an appendage and a pressure field generating arrangement takes the form of an integrated, cohesive device. Preferably, in this case the appendage and the pressure field generating arrangement transition into one another seamlessly. This improves hygiene and operability of the stimulation device.

According to one embodiment, the appendage has a vibration device. This vibration device may be actuated such that the appendage vibrates, as known in the case of electromechanically operated dildos. In this case, the vibration may either be activated independently of the other parts of the stimulation device, or indeed the vibration may be controlled by means of the control device, which in that case controls the drive unit of the pressure field generating arrangement as well. Preferably, the vibration may be controllable in a conventional manner as regards intensity, duration and sequence. The vibration intensifies the direct stimulation effect.

According to one embodiment, a system comprises the stimulation device and a remote control device arranged separately from the stimulation device, wherein the control device of the stimulation device is remotely controlled by the remote control device. This allows a conventional wireless (for example via radio) or wired remote control to be employed in order to allow remote-controlled modulation of the stimulation device or activation thereof by another user.

According to one embodiment, methods for stimulating body parts, in particular the clitoris, are described herein.

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The associated advantageous effects are explained in more detail above in relation to the pressure field and the appendage.

According to one embodiment, the stimulation device may be used as a sex toy for stimulating the female clitoris. As explained in the introduction, the female clitoris is a particularly sensitive erogenous zone in women, which is why the use of an indirect massaging stimulation, combined with a negative-pressure stimulation, for this body part for stimulation up to orgasm appears particularly advantageous.

In one embodiment, the methods for stimulating erogenous zones serve for sexual pleasure, and thus the methods do not serve for medical, for example therapeutic, purposes.

With reference to FIGS. 1, 2 and 3, a first embodiment will be explained below. FIG. 1 shows a front view of the first embodiment of the stimulation device 1 with an appendage 140 in a straight position, while FIG. 2 further shows a side view of the stimulation device 1 with the appendage 140 in an angled position, and FIG. 3 shows a cross section of the first embodiment of the stimulation device 1.

The first embodiment of the stimulation device 1 is a preferably portable electrical or small device that has a housing 8, a pressure field generating arrangement 2, an optional on/off switch 74 and an optional light 9.

The housing 8 preferably takes an ergonomic form such that it can be held comfortably in one hand and has no sharp or pointed edges. Furthermore, the housing 8 may be made of a plastics material such as polycarbonate (PC) or acrylonitrile butadiene styrene (ABS). Moreover, the gripping areas or even the entire housing may be supplemented by or be made of a silicone which has advantageous tactile properties. The housing 8 preferably takes an at least water-resistant or splash-proof form, for example protection class IP 24. Furthermore, the broken line in FIG. 2 indicates an optional side edge of the housing 8.

The optional on/off switch 74 serves to activate and deactivate the stimulation device 1. This on/off switch 74 may for example be a push button, which switches the stimulation device 1 on or off when held down, or a latching slide switch. Alternatively, it may be possible to switch the stimulation device 1 on and off by remote control.

The pressure field generating arrangement 2 of a first embodiment has a first chamber 3 in the interior of stimulation device 1, a second chamber 4 for placing on a body part 11 to be stimulated, and a connection element 5 that connects the first chamber 3 to the second chamber 4.

A drive unit 6, for example an electric motor, drives the first chamber 3 via a shaft 61 and by means of a cam 62 (or alternatively by means of a connecting rod) such that the volume of the first chamber 3 changes in accordance with rotation of the shaft 61 of the drive unit 6. On this point, it should be noted that any types of drive that cause a deflection of the wall 31 of the first chamber 3 for a change in volume can in principle be used in the stimulation device 1. This may for example be performed hydraulically, pneumatically, piezoelectrically, mechanically or electromagnetically. Examples of this are described in more detail below.

A control device 7 activates the drive unit 6, optional operating elements 71 and at least one optional display 72. Here, the control device 7 and the drive unit 6 are supplied with power for example by the internal battery 76 and/or the external power supply 73.

The stimulation device 1 further has at least one appendage 140. This appendage 140, which is preferably part of the housing 8, may optionally be moved or angled in relation to the housing part in which the pressure field generating arrangement 2 is accommodated. Here, the appendage may

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be angled or indeed rotated by means of a joint 141. The joint 141 may for example take the form of a plastically deformable plastic part, an adjustable joint or a hinge. FIG. 2 shows an example of a position of the appendage 140 which is angled in relation to the section of the housing 8 of the stimulation device 1 in which the pressure field generating arrangement 2 is accommodated. Alternatively, the appendage may also take a rigid or immovable form.

The appendage 140 is preferably a stimulation aid for insertion into the human body, for example the vagina or other bodily orifices. Here, the appendage 140 is shaped for example as a conventional dildo. Alternatively, the appendage may be constructed such that it is adapted to the human anatomy of another bodily orifice, for example the mouth. Moreover, the appendage 140 may take a form such that it can also be used as a handle in order to hold the stimulation device 1 comfortably.

Moreover, the appendage 140 may optionally have a vibration device 142 that can be capable of being switched on and/or controlled. The vibration device 142 causes the appendage to undergo mechanical vibrations that support the direct stimulation effect of the appendage 140.

Optionally, the appendage 140 is mounted on the section of the housing 8 that accommodates the pressure field generating arrangement 2 such that the (entire) housing 8 of the stimulation device 1 takes a unitary form. In this way, the housing 8 creates the impression of being in one piece, for example by means of flexible and/or seamless connection elements of the housing 8. Alternatively, the housing 8, including the appendage 140, may have a silicone coating.

In a straight or non-angled orientation of the appendage 140, as shown in FIG. 1, the stimulation device 1 can be comfortably held, or indeed inserted into bodily orifices in a simple manner. If the appendage 140 is angled, as shown in FIG. 2, for example after insertion, the opening 42 can thus be guided out of the body part 11 to be stimulated. In this angled position of the stimulation device 1, both a direct and an indirect stimulation of at least one erogenous zone of the body can take place simultaneously. In this case, the body part 11 to be stimulated is located between the appendage 140 and the pressure field generating arrangement 2.

Furthermore, an optional light 9 can be provided on or in the housing 8. Here, the light 9 preferably serves for lighting the interior of the second chamber 4. The light 9 can either be switched on by the user or automatically activated when the stimulation device 1 is activated. Furthermore, the light 9 can take the form of energy-saving light emitting diodes. The light can for example serve in the dark as an orientation aid for the user of the stimulation device 1, or as additional visual stimulation.

With reference to FIGS. 4, 5 and 6, the construction and function of a first aspect of the pressure field generating arrangement 2 of the stimulation device 1 will be described below in more detail.

FIG. 4 shows the pressure field generating arrangement 2 in a first state, with the second chamber 4 placed on the area of skin or body part 11 to be stimulated. The first state of the pressure field generating arrangement 2 is characterized by a neutral deflection of the first chamber 3, i.e. no external force acts on the first chamber 3, for example from the drive unit. Here, the volume V1 of the first chamber is the standard volume of this chamber 3.

The body part 11 to be stimulated is an area of skin on the body, wherein here for example a particularly sensitive erogenous zone, the clitoris 12, is shown. Thus, use of the stimulation device 1 is not limited to the female clitoris 12, however; rather, the stimulation device 1 can be applied to

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all body parts or erogenous zones (such as the inside of the thighs, lumbar region, nape of the neck, nipples, etc.) which can be stimulated by means of medium- or air-pressure massage and/or negative pressure.

Because it is placed on the body part 11 to be stimulated, the second chamber 4 forms a chamber that is largely or completely closed off from the exterior of the pressure field generating arrangement 2 and whereof the only remaining connection to the second chamber is via the connection element 5, wherein the edges of chamber 4 ideally form an air-tight enclosure with the surface of the body part 11. Two communicating chambers 3 and 4 are created in this way, wherein a corresponding pressure equalization between the chambers 3 and 4 via the connection element 5 occurs in the event of a change in volume in one of the chambers 3 or 4.

A wall 31 of the first chamber 3 is secured by means of a holder 32. The holder 32 is in turn attached to the housing 8. The wall 41 of the second chamber is furthermore mounted on the holder 32. Two mutually aligned openings in the wall 41 of the second chamber and the holder 32 together form the connection element 5, which connects the first chamber 3 and the second chamber 4. In this arrangement, the wall 31, the holder 32 and the wall 41 are preferably joined to each other by adhesion to be medium- or air-tight. Alternatively, they can also be press-fitted or screwed to each other (for example with the aid of sealing areas between the housing 8 and the respective part). The holder 32 can also be joined to the housing 8 for example by adhesion or screws.

The wall 31 of the first chamber 3 is preferably made of a flexible medium- or air-tight material such as rubber. The holder 32 is preferably made of a rigid plastics material which is likewise medium- or air-tight. The wall 41 of the second chamber is preferably made of a flexible, skin-friendly material such as silicone or rubber.

FIG. 5 shows the pressure field generating arrangement 2 of FIG. 4 in a second state, wherein the second chamber 4 is once again placed on the body part 11 to be stimulated. The second state is characterized in that a force A acting on the first chamber 3 causes the chamber 3 to expand. To be precise, in this exemplary embodiment the force A draws the wall 31 of the first chamber 3 in a direction away from the second chamber 4.

This increases the volume V2 in the chamber 3, i.e. $V2 > V1$. To equalize the difference in pressure created between the chambers 3 and 4, the medium or air now flows from the second chamber 4 into the first chamber 3.

Assuming that in the first state the pressure in the chambers 3 and 4 corresponds to the currently prevailing external reference pressure (air pressure for example), the overall pressure that is present in the second state will be lower than the external reference pressure. This negative pressure is set such that it is preferably lower than the usual systolic blood pressure in the blood vessels of the body part 11. The blood circulation in this area thus increases, and the clitoris 12 is better supplied with blood in the second state.

FIG. 6 shows the pressure field generating arrangement 2 in a third state, wherein the second chamber 4 is once again placed on the body part 11 to be stimulated. The third state is characterized in that a force B acting on the first chamber 3 causes a volume reduction or compression in the chamber 3. To be precise, the direction of the force B is opposed to the direction of the force A and deforms the wall 31 of the first chamber such that the resulting volume V3 of the chamber is smaller than the volume V1. The compression of the chamber 3 causes a positive pressure in the chamber 3,

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which is equalized by a medium or air flow through the connection element 5 in the direction of the second chamber 4.

This flow of medium is now preferably directed, by the orientation of the opening 51 and/or of the connection element 5, towards the body part 11 to be stimulated, in particular towards the glans of the clitoris 12. The indirect (pressure) massage according to one embodiment occurs as a result of the medium flowing onto the body part 11. The size of the opening 51 is in this case dimensioned such that it is small enough in relation to the volume displaced in the first chamber 3 to sufficiently accelerate the medium for a perceptible massaging effect.

Furthermore, the type of flow can not only be advantageously influenced by the size and orientation of the opening 51 but also by the inner configuration of the connection element. For example, helical grooves in the connection element 5 can cause the flow according to one embodiment to swirl, wherein the flow profile develops a "softer" or more turbulent action on the body part to be stimulated. Alternatively, the pressure field produced in the second chamber 4 can be adjusted to suit the application by means of a plurality of openings 51.

The advantage of the arrangement shown in FIGS. 4 to 6 is that it is unproblematic from the point of view of hygiene (because dead spaces are avoided, for example) and is simple to manufacture. For example, no valves or further openings in or on the first chamber 3 are required.

FIG. 7 shows a second aspect with an alternative construction of the pressure field generating arrangement 2. Here, the walls 31 and 41 of the first and second chambers 3 and 4 can engage with one another such that, as in the first aspect of construction of the pressure field generating arrangement 2, they form two communicating chambers with a connection element 5. Thus, a separate holder is not required, while the second chamber 4 is replaceable. Moreover, the connection element 5 can take a form integral or in one piece with the wall 41 of the second chamber 4. A replaceable chamber 4 has the advantage that in this way various shapes of the chamber 4 that are adjusted to the respective body part can be used (a more detailed description thereof is provided below) without the need to replace the entire stimulation device 1. Alternatively, the second chamber 4 can also be attached to the housing 8 by being pushed on (not shown in more detail). The wall 31 of the first chamber 3 can be joined to the housing 8 by adhesion or screws for example.

It is also possible, as shown in more detail in FIG. 7 by the broken line and the double arrow C, for the first chamber 3 to be expanded and compressed by a force acting perpendicularly to the axial direction of the connection element 5. In principle, the force exerted indirectly or directly on the first chamber 3 by the drive unit 5 can be exerted from any direction. The only decisive criterion here is that the volume of the first chamber 3 can be increased and decreased by the drive unit 6.

FIG. 8 shows a third aspect of a one-piece structure of the pressure field generating arrangement 2. Here, a resilient material such as silicone or rubber can be used as material for the chambers 3 and 4. The advantage here is that any gaps that are dubious from the point of view of hygiene are avoided, and the cost of manufacture is reduced. The pressure field generating arrangement 2 can be joined to the housing 8 by adhesion or screws in this case too. A change in the volume of the first chamber 3 occurs here in a manner analogous to that described in conjunction with FIG. 7.

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FIG. 9 shows a fourth aspect of an alternative construction of the pressure field generating arrangement 2. Here, the second chamber 4, a plurality of connection elements 5, and partial sections of the wall 31 of the first chamber 3 are constructed in one piece. Alternatively, the pressure field generating arrangement 2 can also be constructed in two or more pieces from individual components, while retaining the geometric shape of FIG. 9, in a similar way to that shown in FIG. 4 or 7.

In this case, the volume in the chamber 3 is changed in a manner similar to a piston pump, although there are no valves of any kind here. Thus, a piston 63 is moved back and forth by the drive unit, for example an electric motor or electromagnet, in the directions of the double arrow D. This type of drive has the advantage that the volume of the first chamber 3 can be reduced to zero or approximately zero in a simple manner, thus allowing the first chamber 3 to be almost completely emptied.

The embodiment of the connection element 5, with a plurality of channels 52 and openings 51, results in a distribution of the pressure field over a plurality of concentration points. While the embodiment of the connection element 5 with only one channel, as described in conjunction with FIG. 6, results in the formation of a highly concentrated medium or air flow onto a target area, the embodiment of the connection element 5 shown in FIG. 9 allows the medium or air flow to be distributed over a plurality of target areas. In this way, the flow can for example be blown against the clitoris 11 not just on its glans, but evenly from a plurality of sides. Depending on the application, this distribution of the air flow concentration to a plurality of areas can help to avoid overstimulation and/or help to increase the stimulation area.

FIGS. 10a to 10c show (partial) cross sections of one embodiment of a construction of the pressure field generating arrangement 2 with a bending element 64 as the drive for changing the volume in the first chamber 3. The bending element 64 can for example be a conventional piezoelectric bending element, which is deformed or bent once a voltage is applied. In this embodiment, the wall 31 of the first chamber 3 takes a rigid or stiff form, while the bending element 64 is made to fit suitably against the sides of the first chamber 3. The transition points between the bending element 64 and the wall 31 are in this case sealed (resiliently joined by adhesion, for example). In this construction, the drive for the pressure field generating arrangement 2 is already integrated therein, and an external drive is not required. An electric motor with a cam is not needed, for example. This allows, inter alia, the reduction of any disruptive natural resonances due to movement of the cam of the stimulation device.

FIG. 10a shows in detail the pressure field generating arrangement 2 with the bending element 64 in a neutral position. Thus, the volume of the first chamber 3 with the bending element 64 in the neutral position is the standard volume. FIG. 10b furthermore shows the first chamber 3 with an excited and, consequently, outwardly bent bending element, for which reason the volume of the first chamber 3 has increased; consequently, a negative pressure prevails in the pressure field generating arrangement 2. FIG. 10c shows a bending element of the first chamber 3 excited in the opposite direction to FIG. 10b, for which reason the volume of the first chamber 3 has decreased; consequently, a positive pressure prevails in the pressure field generating arrangement 2.

FIG. 11 shows a second embodiment of a spatially separated arrangement of the chambers 3 and 4 of the pressure

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field generating arrangement 2. The chambers 3 and 4 are in this case connected via an extended connection element 5, which can be a relatively long flexible hose or a pipe, which may also be rigid. For example, the connection element 5 may be 0.5 m in length. This enables the housing 8 to be held in one hand while the other hand holds the second chamber 4 on the body part 11 to be stimulated; or the housing 8 may simply be laid aside, while the user holds only the second chamber 4 in both hands. Alternatively, the appendage 140 can be inserted into a body part, in which case it is no longer necessary for the stimulation device 1 to be held in the hand.

FIGS. 12 a) to 12 f) show various bottom and side views of further aspects of the second chamber 4 in accordance with one or more embodiments. In detail, FIG. 12 a) shows a bottom view of a circular second chamber 4 with a central opening 51; FIG. 12 b) shows a bottom view of a triangular second chamber 4 with a central opening 51; FIG. 12 c) shows a bottom view of an oval second chamber 4 with a central opening 51; and FIG. 12 d) shows a bottom view of an approximately eight-shaped second chamber 4 with two openings 51 arranged offset from the center. FIG. 12 e) furthermore shows a side cross section of a second chamber 4, wherein the second chamber 4 additionally has an extended contact surface 43 for the skin or a support part 43 to improve the sealing function of the second chamber 4 on the skin. The extended contact surface 43 may moreover have grooves or projections that improve the sealing function even further. FIG. 12 f) shows a side cross section of a second chamber 4 having a plurality of separate connection elements 5 and an extended contact surface resulting from the support part 43.

The shape of the second chamber 4 can thus be fundamentally adjusted to the anatomy of the erogenous zone to be stimulated. The shape of the chamber 4 in FIG. 12 a) is, for example, adjusted to the round shape of the breast, while the shape of chamber 4 in FIG. 12 c) is better suited to the shape of the female vulva. Furthermore, the shape of the second chamber 4 also determines how pronounced the pressure field is. The size of the second chamber 4 in relation to the volume displaced from the first chamber 3 thus determines the level of the achievable negative or positive pressure. Furthermore, the proximity of the opening 51 of the connection element 5 to the area of skin to be stimulated can also be used to determine the intensity of the massaging effect on said area of skin. A plurality of openings 51, cf. FIG. 12 d), allows the massaging effect to be distributed over a plurality of areas. Thus, for example, the clitoris can be stimulated less directly at the very sensitive clitoral glans (cf. FIG. 12 e)) but more at the areas surrounding the clitoral glans, in order to prevent overstimulation of the clitoris.

FIG. 13 shows a block diagram of an example of the functional construction of an embodiment having a control device 7, a drive unit 6, a light 9, an on/off switch 74, operating elements 71, a battery 76 and an external power supply 73.

The control device 7, which for example has a microcontroller or is hardwired, initially controls the power supply to all the consumers of the stimulation device 1 and optionally controls a process of charging and discharging the battery 76 and/or battery management. In particular, the control device 7 controls the excitation of the drive unit 6, such as the size of the deflection, the frequency, the modulation, etc.

Optionally provided operating elements 71 serve to set the mode of the device, i.e. to set the modulation pattern of the pressure field. The operating elements 71 may for example take the form of at least one push button, at least one rotary switch, or at least one touch-sensitive switch. Furthermore,

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the operating elements 71 may emit optical feedback for the purpose of confirmation, for example by means of light emitting diodes (LEDs) integrated in the switch.

An optional display 72 serves to inform the user of the device state and/or the set condition. The display 72 may for example take the form of a plurality of light emitting diodes or an LCD display. The displayed information may for example be the charging condition of an optional battery, or the current setting of the modulation pattern.

Furthermore, the control device 7 may have a memory in which at least one modulation or stimulation pattern (described in more detail in conjunction with FIGS. 14 a) to d)) is stored. Excitation of the drive unit 6 can now be activated via the operating elements 71 in accordance with this previously stored stimulation pattern, depending on the choice made by the user of the stimulation device 1. The stimulation pattern of the pressure field can also be optionally and individually generated and stored by the user via the operating elements.

A socket (not shown in detail) can serve to supply external power to the stimulation device 1 via an external plug that is for example connected to an external mains adapter. In order to ensure that the stimulation device 1 is splash-proof, it is also possible, instead of the socket, to provide an electromagnetically inductive transformer that allows power to be supplied to the stimulation device 1 without an electrically conductive contact. Preferably, the stimulation device 1 moreover has a battery, for example a nickel metal hydride battery (NiMH), for wireless operation. Alternatively, a (relatively long) power supply cable may lead out of the stimulation device.

FIG. 14 a) shows the sequence over time of overall pressure p in the pressure field generating arrangement (2) when the latter is used for stimulation. The broken line indicates the reference pressure, for example the currently prevailing atmospheric pressure, outside the pressure field generating arrangement (2). If the second chamber 4 is now placed on the body part 11 to be stimulated, the initially prevailing ambient pressure remains approximately constant in the pressure field generating arrangement (2). It is assumed that the second chamber 4 is placed on the body part to be stimulated such that it is largely air-tight. Once the stimulation device is activated, the drive unit 6 is activated or excited by the control device 7 in accordance with a previously stored stimulation pattern. Accordingly, the volume of the first chamber 3 and thus the overall pressure in the pressure field generating arrangement 2 are changed, with the changes in pressure being modulated onto the reference pressure. The pressure or stimulation pattern shown as an example in FIG. 14 a) develops a pulsed, regular pressure field. In phases of pressure increase, air is blown against or massages the erogenous zone to be stimulated, whereas at times when a negative pressure prevails the blood circulation in the body part 11, for example the clitoris, is favored. Thus, there are time periods (designated in FIG. 14 a) as I)) in which a negative pressure prevails while the clitoris is simultaneously being indirectly massaged.

FIG. 14 b) shows three examples of alternative stimulation patterns. Thus, the area designated as II) shows a pulsed stimulation pattern of high amplitude. The area designated as III) shows a pulsed stimulation pattern of low amplitude. Furthermore, the area designated as IV) illustrates a stimulation pattern which is irregular as regards sequence over time and asymmetrical in amplitude. The patterns can be varied, depending on the effect on the body/application and in accordance with the wishes of the individual.

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FIG. 14 c) shows a further example of an alternative stimulation pattern. Here, the intensity of the pressure may increase with time in order to adjust to the user's state of excitement.

In addition to the embodiments that have been explained, further constructional principles are allowed. For example, different arrangements or constructions of the first chamber 3 may be combined as desired with different embodiments of the second chamber 5 or the connection element 5. For example, the first chamber 3 having the drive in FIG. 10 can be combined with the second chamber in FIG. 12 f).

Although only one first chamber 3 is shown in all embodiments, two or more first chambers 3 may also be provided, which are then driven accordingly simultaneously or with a time delay such that their volume is changed in order to build up a pressure field.

Although only one opening from the first chamber 3 to the connection element 5 is shown in all embodiments, a plurality of openings for a connection element 5 or indeed a plurality of openings for a plurality of connection elements 5 may also be provided in the first chamber 3.

A stimulation device 1 can have a plurality of pressure field generating arrangements 2. Thus, for example, two pressure field generating arrangements may be provided in order to stimulate two erogenous zones simultaneously.

The stimulation patterns can differ from the patterns shown in FIGS. 14 a), b) and c), provided they have a sequence of positive and negative pressures over time. For example, a relatively long-lasting negative pressure can initially be built up at the beginning or after activation of the device (for example 3 minutes), in order to effectively increase the blood circulation in the zone to be stimulated, after which pulses of negative and positive pressures of slowly increasing amplitude follow.

LIST OF REFERENCE NUMERALS

- 1 Stimulation device
- 2 Pressure field generating arrangement
- 3 First chamber
- 4 Second chamber
- 5 Connection element
- 6 Drive unit
- 7 Control device
- 8 Housing
- 9 Light
- 11 Body part
- 12 Clitoris
- 31 Wall of the first chamber
- 32 Holder
- 41 Wall of the second chamber
- 42 Opening of the first chamber
- 43 Contact surface
- 51 Opening from the connection element to the second chamber
- 61 Drive shaft
- 62 Cam
- 63 Piston
- 64 Bending element
- 71 Operating element
- 72 Display
- 73 Power supply
- 74 On/off switch
- 76 Battery
- 77 Control board
- 140 Appendage
- 141 Joint
- 142 Vibration device

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The invention claimed is:

1. A stimulation device, comprising:
a chamber having a flexible wall portion;
a drive unit in physical communication with the flexible
wall portion so as to cause deflections of the flexible
wall portion in opposing directions, thereby resulting in
a changing volume of the chamber,
the changing volume of the chamber resulting in modu-
lated positive and negative pressures with respect to a
reference pressure;
an opening for applying the modulated positive and
negative pressures to a body part;
a control device for controlling the drive unit; and
an appendage, wherein the appendage is a dildo config-
ured to be inserted into a vagina.
2. The stimulation device as recited in claim 1, wherein
the appendage is a handle for holding the stimulation device.
3. The stimulation device as recited in claim 1, wherein
the opening is further for placing over the body part.
4. The stimulation device as recited in claim 1, wherein
the body part is a clitoris.
5. The stimulation device as recited in claim 1, further
comprising a second chamber.
6. The stimulation device as recited in claim 1, wherein
the flexible wall portion is integral with the chamber.
7. The stimulation device as recited in claim 1, wherein
the flexible wall portion comprises silicone.
8. The stimulation device as recited in claim 1, wherein
the stimulation device has no valves.
9. The stimulation device as recited in claim 1, wherein
the stimulation device is a portable hand-held device.
10. The stimulation device as recited in claim 1, wherein
the stimulation device is battery powered.
11. The stimulation device as recited in claim 1, further
comprising:
a water resistant housing comprising acrylonitrile buta-
diene styrene (ABS).
12. A method comprising:
causing deflections of a flexible wall portion of a chamber
of a stimulation device in opposing directions, thereby
resulting in a changing volume of the chamber,
the changing volume of the chamber resulting in modu-
lated positive and negative pressures with respect to a
reference pressure; and
applying the modulated positive and negative pressures to
a body part through an opening, wherein the stimula-
tion device is positioned by a user for applying the
modulated positive and negative pressures using an
appendage of the stimulation device, wherein the
appendage is a dildo configured to be inserted into a
vagina.
13. The method as recited in claim 12, wherein the
appendage is a handle for holding the stimulation device.
14. The method as recited in claim 12, wherein the
changing volume of the chamber results in the modulated
positive and negative pressures in a second chamber.
15. The method as recited in claim 12, wherein the body
part is a clitoris and the opening is placed over the clitoris.
16. The method as recited in claim 12, wherein the
flexible wall portion is integral with the chamber.

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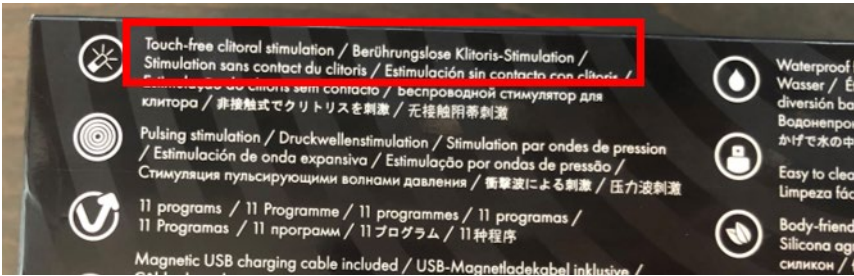
17. A stimulation device, comprising:

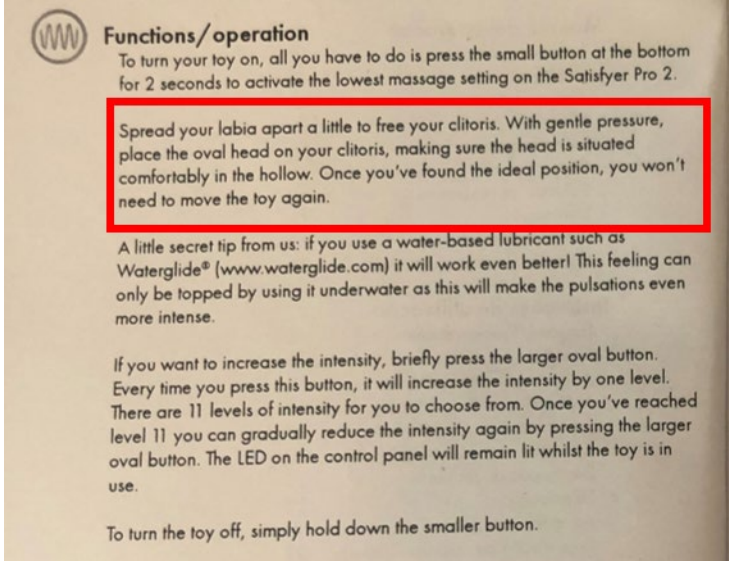
- a pressure field generator having a flexible wall portion;
a drive unit in physical communication with the flexible
wall portion so as to cause deflections of the flexible
wall portion in opposing directions, thereby resulting in
a changing volume of the pressure field generator,
the changing volume of the pressure field generator
resulting in modulated positive and negative pressures
with respect to a reference pressure;
an opening for applying the modulated positive and
negative pressures to a body part;
a control device for controlling the drive unit; and
an appendage, wherein the appendage is a dildo config-
ured to be inserted into a vagina.
18. The stimulation device as recited in claim 17, wherein
the appendage is a handle for holding the stimulation device.
19. The stimulation device as recited in claim 17, wherein
the body part is a clitoris and the opening is further for
placing over the body part.
20. The stimulation device as recited in claim 17, wherein
the body part is a clitoris.
21. The stimulation device as recited in claim 17, wherein
the pressure field generator comprises a first chamber and a
second chamber.
22. The stimulation device as recited in claim 17, wherein
the flexible wall portion is integral with the pressure field
generator.
23. The stimulation device as recited in claim 17, wherein
the stimulation device has no valves.
24. The stimulation device as recited in claim 17, wherein
the stimulation device is a portable hand-held device.
25. The stimulation device as recited in claim 17, wherein
the stimulation device is battery powered.
26. A method comprising:
causing deflections of a flexible wall portion of a pressure
field generator of a stimulation device in opposing
directions, thereby resulting in a changing volume of
the pressure field generator,
the changing volume of the pressure field generator
resulting in modulated positive and negative pressures
with respect to a reference pressure; and
applying the modulated positive and negative pressures to
a body part through an opening, wherein the stimula-
tion device is positioned by a user for applying the
modulated positive and negative pressures using an
appendage of the stimulation device, wherein the
appendage is a dildo configured to be inserted into a
vagina.
27. The method as recited in claim 26, wherein the
appendage is a handle for holding the stimulation device.
28. The method as recited in claim 26, wherein causing
deflections in a flexible wall portion of a pressure field
generator in opposing directions comprises:
causing deflections in the flexible wall portion of a first
chamber of the pressure field generator, thereby result-
ing in the modulated positive and negative pressures in
a second chamber of the pressure field generator.
29. The method as recited in claim 26, wherein the body
part is a clitoris and the opening is placed over the clitoris.
30. The method as recited in claim 26, wherein the
flexible wall portion is integral with the pressure field
generator.

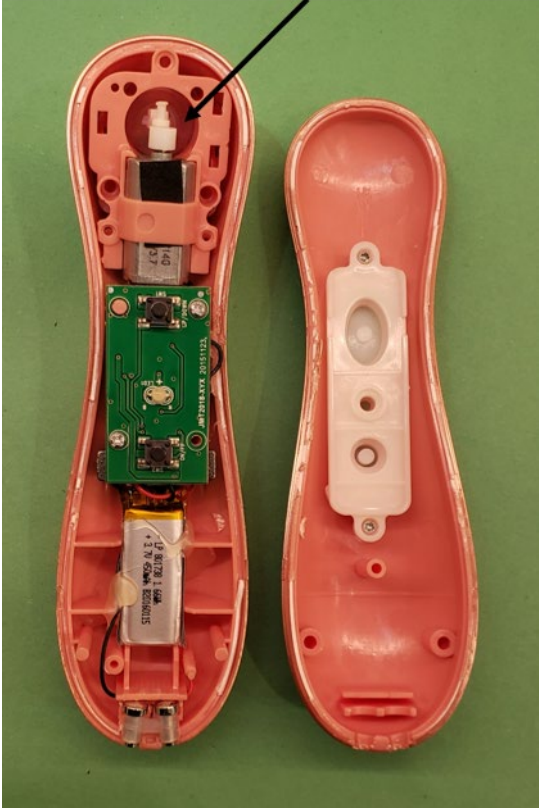
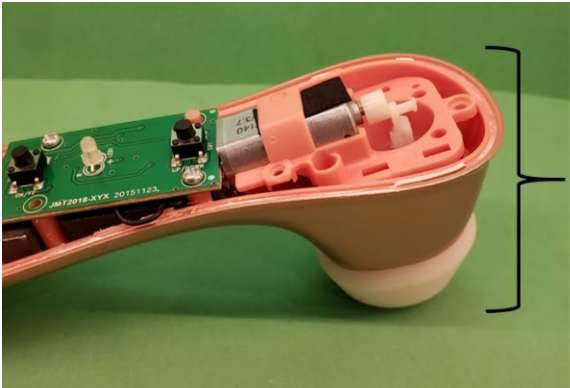
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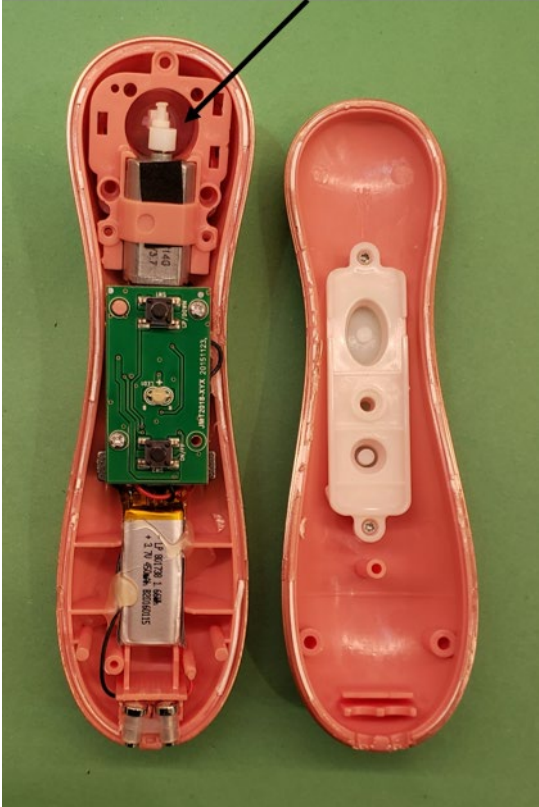
Exhibit 4


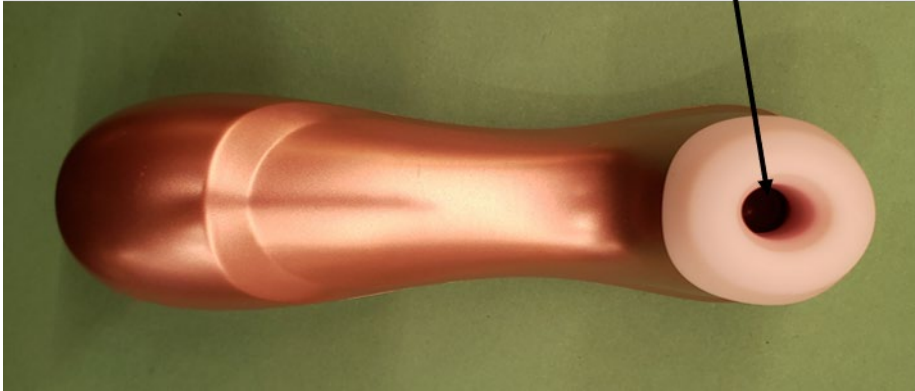
**REPRESENTATIVE CLAIM CHART 1:
SATISFYER PRO 2 AND CLAIM 1 OF U.S. PATENT NO. 9,763,851 (“’851 PATENT”)**

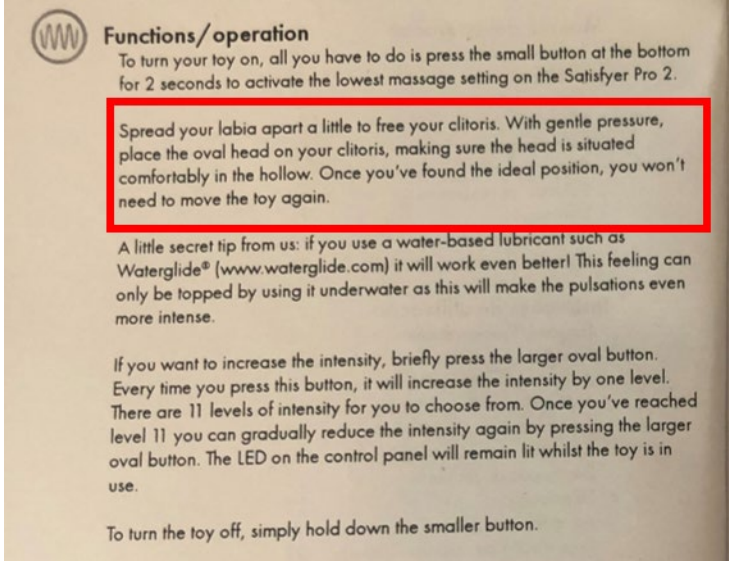
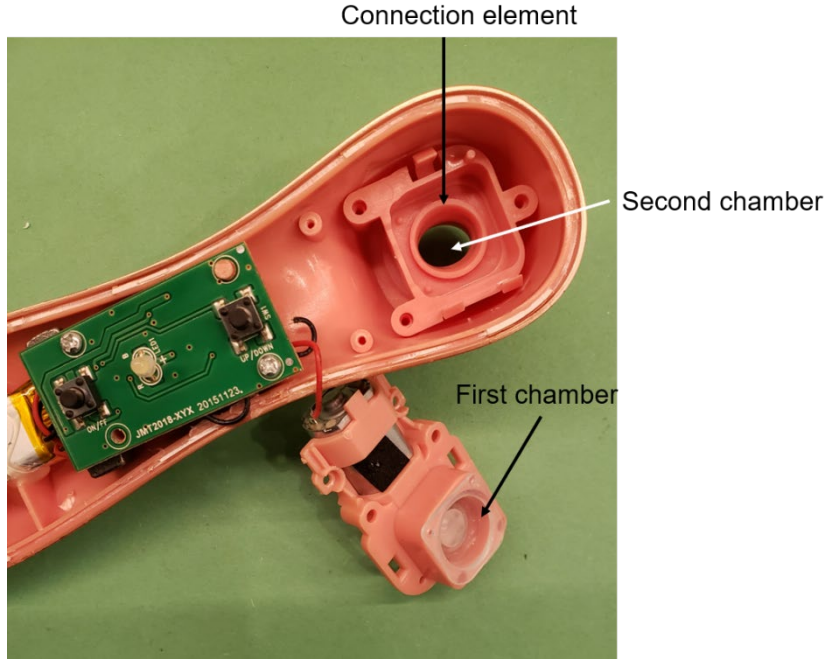
Claim Language of the ’851 Patent	Satisfyer Pro 2
1. A stimulation device for a clitoris, comprising:	<p>The Satisfyer Pro 2 is a stimulation device for a clitoris.</p> <p>The following packaging shows the Satisfyer Pro 2.</p> <div></div> <p>The Satisfyer Pro 2 packaging (annotated below) describes the device as having “Touch-free clitoral stimulation”:</p> <div></div>

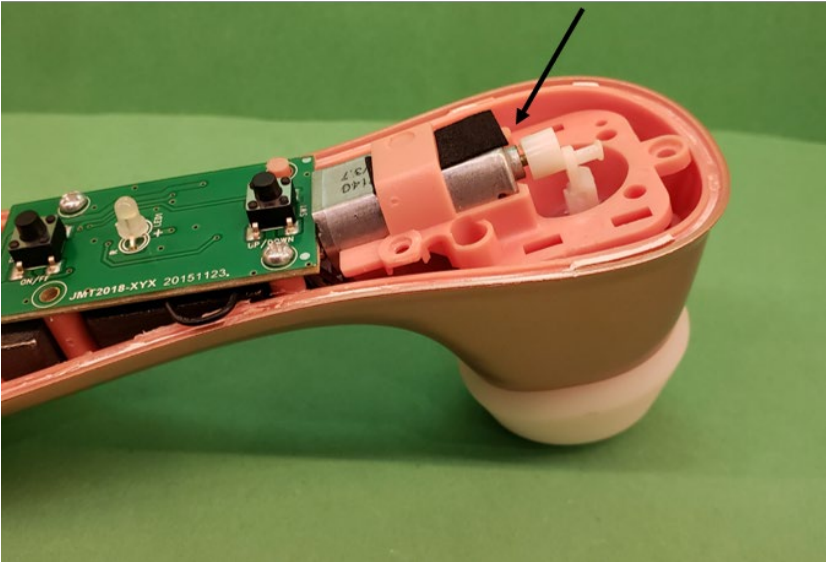
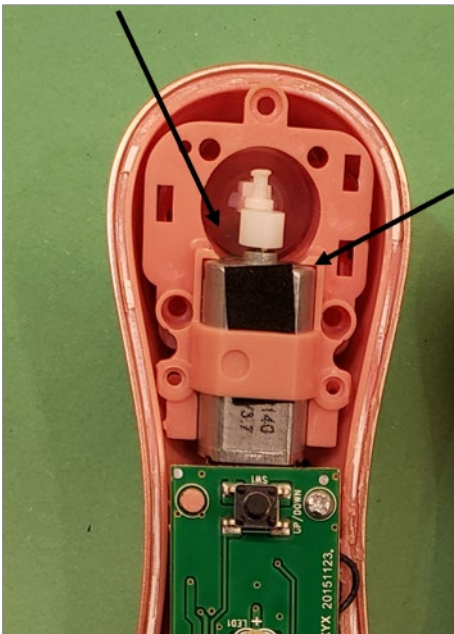
Claim Language of the '851 Patent	Satisfyer Pro 2
	<p>The Satisfyer Pro 2 User Manual (page 3 annotated below) describes the device as a stimulation device for a clitoris:</p>  <p>Functions/operation</p> <p>To turn your toy on, all you have to do is press the small button at the bottom for 2 seconds to activate the lowest massage setting on the Satisfyer Pro 2.</p> <p>Spread your labia apart a little to free your clitoris. With gentle pressure, place the oval head on your clitoris, making sure the head is situated comfortably in the hollow. Once you've found the ideal position, you won't need to move the toy again.</p> <p>A little secret tip from us: if you use a water-based lubricant such as Waterglide® (www.waterglide.com) it will work even better! This feeling can only be topped by using it underwater as this will make the pulsations even more intense.</p> <p>If you want to increase the intensity, briefly press the larger oval button. Every time you press this button, it will increase the intensity by one level. There are 11 levels of intensity for you to choose from. Once you've reached level 11 you can gradually reduce the intensity again by pressing the larger oval button. The LED on the control panel will remain lit whilst the toy is in use.</p> <p>To turn the toy off, simply hold down the smaller button.</p>

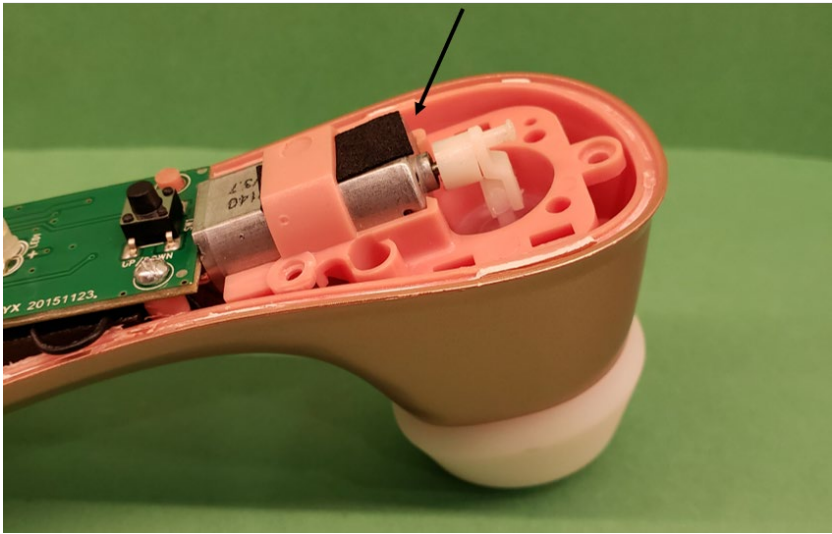
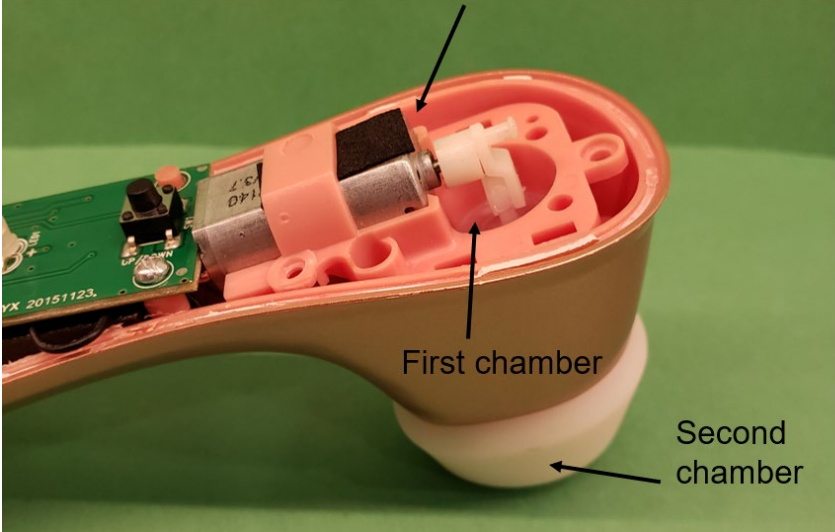
Claim Language of the '851 Patent	Satisfyer Pro 2
a pressure field generator comprising:	<p>The Satisfyer Pro 2 has a pressure field generator, as shown in the below annotated photographs of a disassembled product:</p> <p>Pressure field generator</p>   <p>Pressure field generator</p>

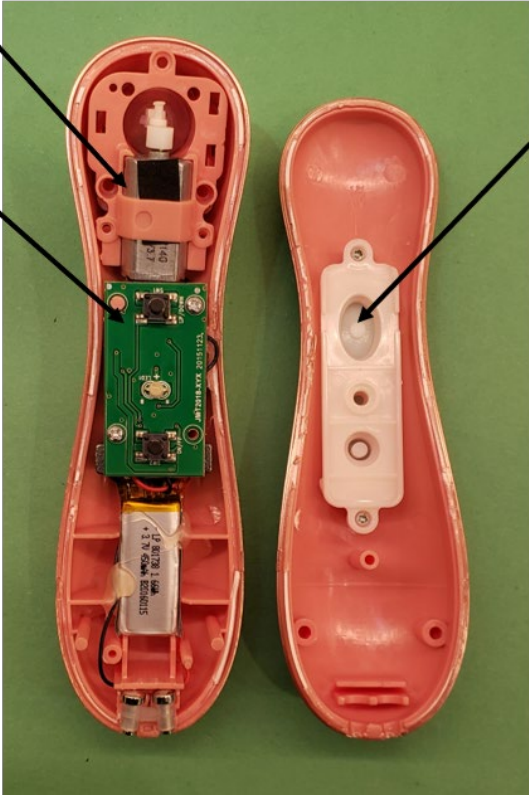
Claim Language of the '851 Patent	Satisfyer Pro 2
a first chamber having a single opening;	<p>The pressure field generator of the Satisfyer Pro 2 includes a first chamber having a single opening, as shown in the below annotated photographs of a disassembled product:</p> <p>Pressure field generator</p> 

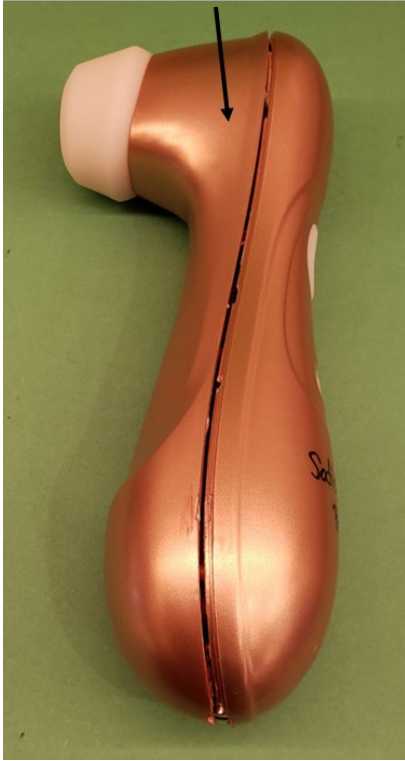
Claim Language of the '851 Patent	Satisfyer Pro 2
	<p>First chamber with single opening</p> 
<p>a second chamber having first and second openings, the second opening of the second chamber for placing over the clitoris; and</p>	<p>Satisfyer Pro 2's pressure field generator includes a second chamber having first and second openings, the second opening of the second chamber for placing over the clitoris, as shown in the below annotated photograph of a product.</p> <p>Second chamber</p> 

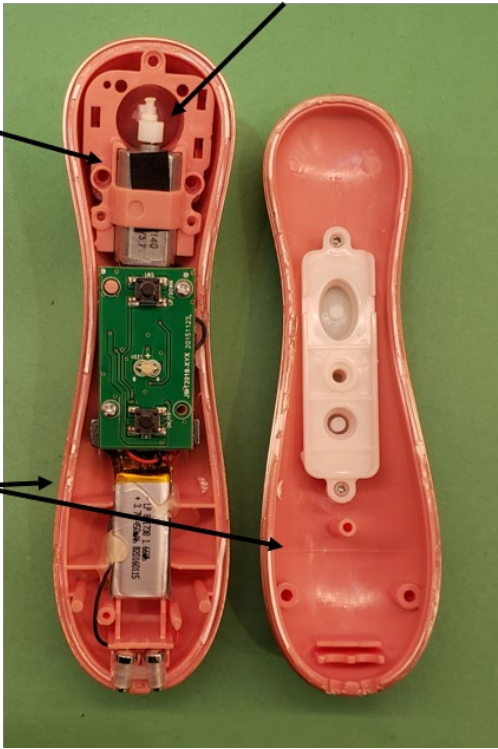
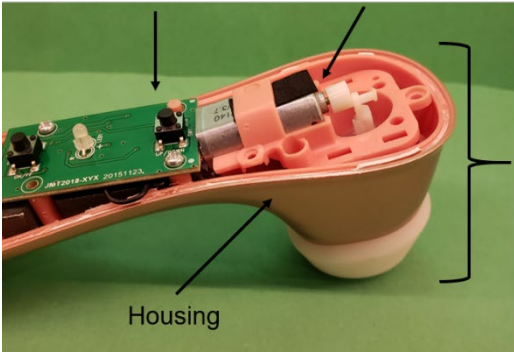
Claim Language of the '851 Patent	Satisfyer Pro 2
	<p>The Satisfyer Pro 2 User Manual (page 3, annotated below) describes the second opening of the second chamber is for placing over the clitoris:</p> 
<p>a connection element having a first opening and a separate second opening thereby forming a straight channel connecting the single opening of the first chamber with the first opening of the second chamber;</p>	<p>Satisfyer Pro 2's pressure field generator includes a connection element having a first opening and a separate second opening thereby forming a straight channel connecting the single opening of the first chamber with the first opening of the second chamber, as shown in the below annotated photograph of a disassembled product:</p> 

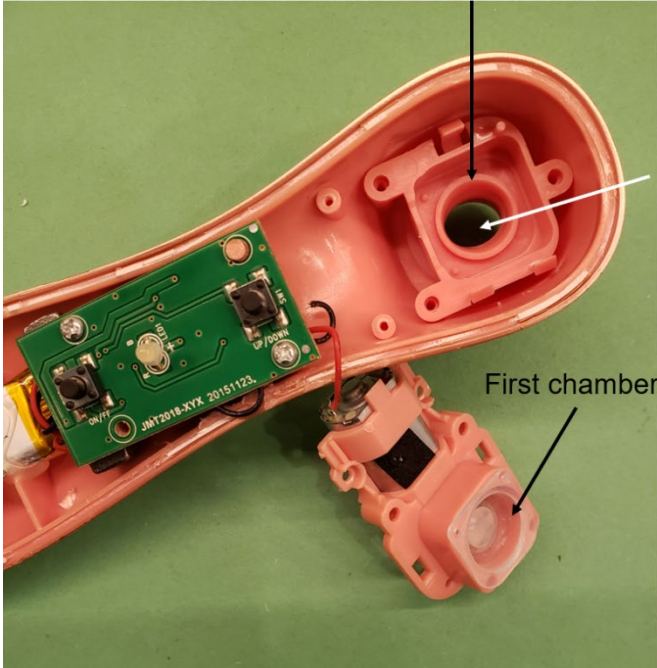
Claim Language of the '851 Patent	Satisfyer Pro 2
<p>a drive unit that changes a volume of the first chamber in such a manner that a stimulating pressure field is generated in the second chamber via the connection element; and</p>	<p>The Satisfyer Pro 2 includes a drive unit (<i>i.e.</i>, a motor) that changes a volume of the first chamber in such a manner that a stimulating pressure field is generated in the second chamber via the connection element, as shown in the below annotated photographs of a disassembled product:.</p> <div><p>Drive unit</p></div> <div><p>First chamber</p><p>Drive unit</p></div>

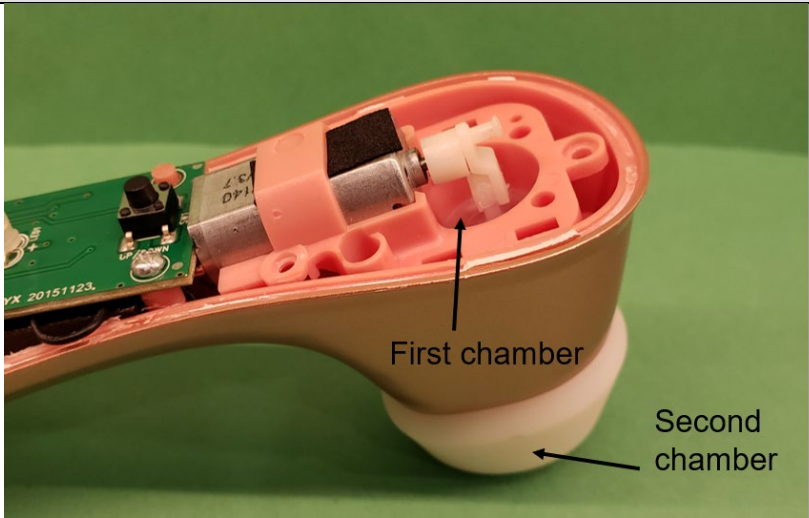
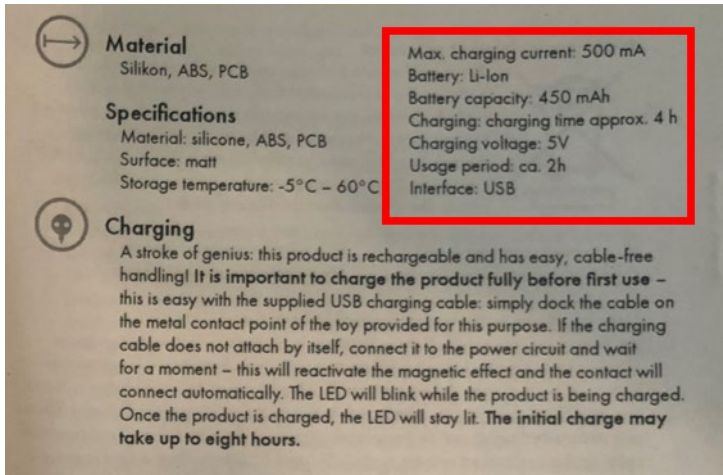
Claim Language of the '851 Patent	Satisfyer Pro 2
	<p>Drive unit</p>  <p>Drive unit</p>  <p>First chamber</p> <p>Second chamber</p>


Claim Language of the '851 Patent	Satisfyer Pro 2
a control device that actuates the drive unit; and	<p>The Satisfyer Pro 2 includes a control device, including a printed circuit board assembly, that actuates the drive unit (<i>i.e.</i>, motor) inside the device upon activation by the buttons projecting outside of the device housing, as shown in the below annotated photograph of a disassembled product:</p> <div><p>Drive unit</p><p>Control Device</p><p>Button</p></div>

<p>a housing enclosing the pressure field generator, the drive unit, and the control device; wherein:</p>	<p>The Satisfyer Pro 2 includes a housing enclosing the pressure field generator, the drive unit, and the control device, as shown in the below annotated photographs of a disassembled product:</p> <p style="text-align: center;">Housing</p> 
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Claim Language of the '851 Patent	Satisfyer Pro 2
	<div><p>Pressure field generator</p><p>Drive unit</p><p>Control device</p><p>Housing</p></div> <div><p>Control device</p><p>Drive unit</p><p>Housing</p><p>Pressure field generator</p></div>

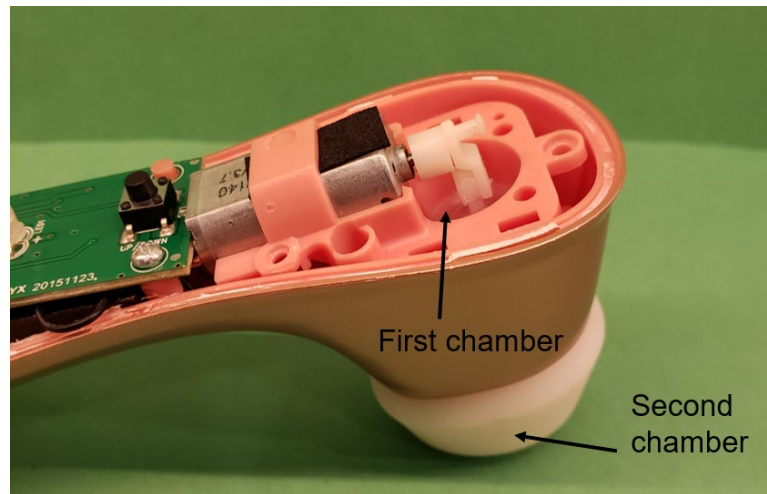
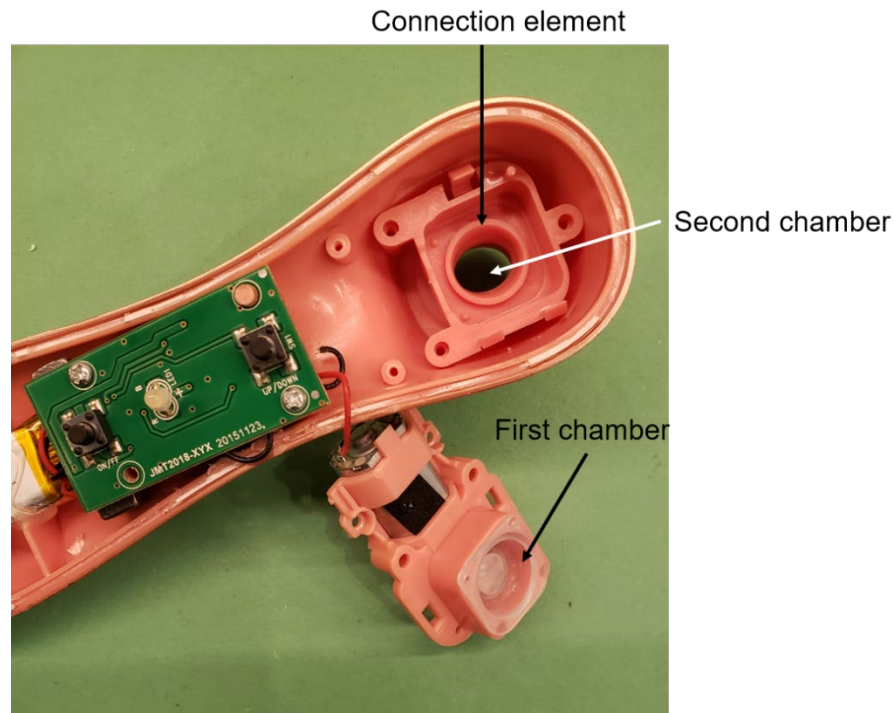
Claim Language of the '851 Patent	Satisfyer Pro 2
<p>the pressure field generated in the second chamber consists of a pattern of negative and positive pressures modulated with respect to a reference pressure,</p>	<p>The pressure field generated in the second chamber of the Satisfyer Pro 2 consists of a pattern of negative and positive pressures modulated with respect to a reference pressure.</p> <p>When the device is in operation, the pressure field generator generates a pressure field in the second chamber of the Satisfyer Pro 2 with a pattern of negative and positive pressures, modulated with respect to a reference pressure (<i>i.e.</i>, ambient pressure). The '851 Patent explains the reference pressure is the prevailing ambient pressure acting on the device prior to placing the stimulation device on the area of the skin. <i>See, e.g.</i>, '851 Patent, col. 4, ll. 20-25; col. 12, ll. 49-56.</p>
<p>the first chamber is connected with the second chamber solely by the connection element,</p>	<p>The first chamber of the Satisfyer Pro 2 is connected with the second chamber solely by the connection element, as shown in the below annotated photographs of a disassembled product:</p>  <p>Connection element</p> <p>Second chamber</p> <p>First chamber</p>

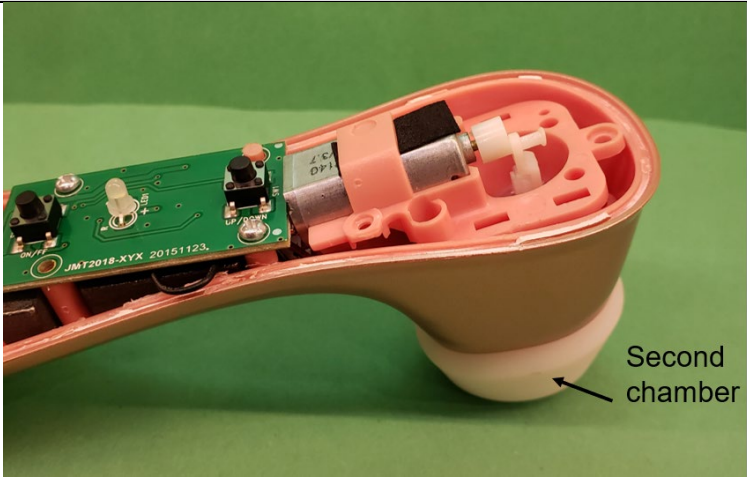
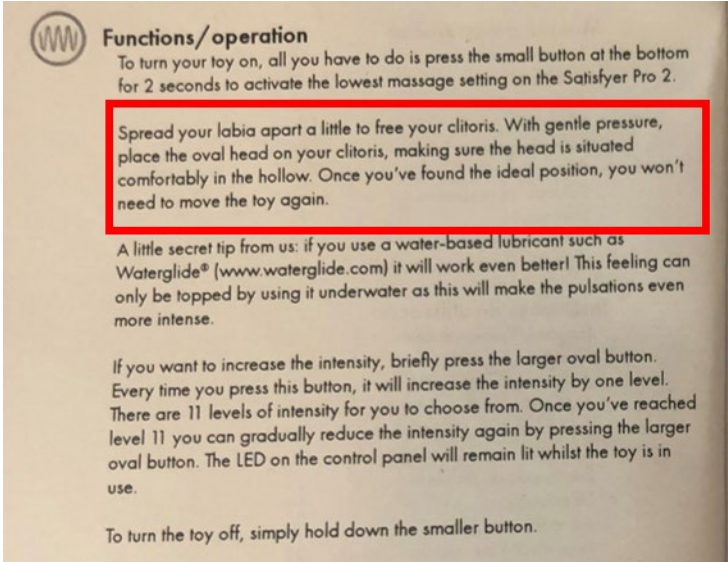
Claim Language of the '851 Patent	Satisfyer Pro 2
	
the stimulation device has no valves,	The Satisfyer Pro 2 has no valves.
the stimulation device is a portable hand-held device with a battery,	<p>The Satisfyer Pro 2 is a portable, hand-held device with a battery.</p> <p>The Satisfyer Pro 2 User Manual (page 4, annotated below) describes details about the battery:</p> 

Claim Language of the '851 Patent	Satisfyer Pro 2
	<p>The Satisfyer Pro 2 is portable and hand-held as shown in this photograph of the Satisfyer Pro 2:</p> 

the connection element is rigid and the first and second openings of the connection element are aligned to one another so that a media flow during a compression of the first chamber is directed to the clitoris through the straight channel with a nozzle effect, and

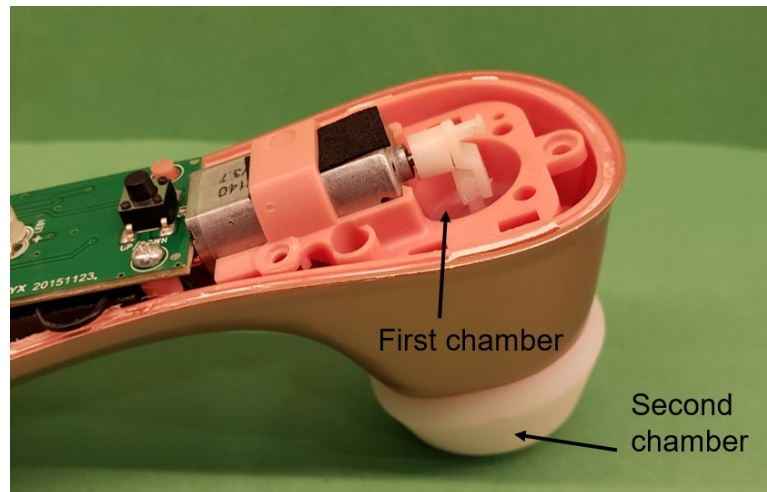
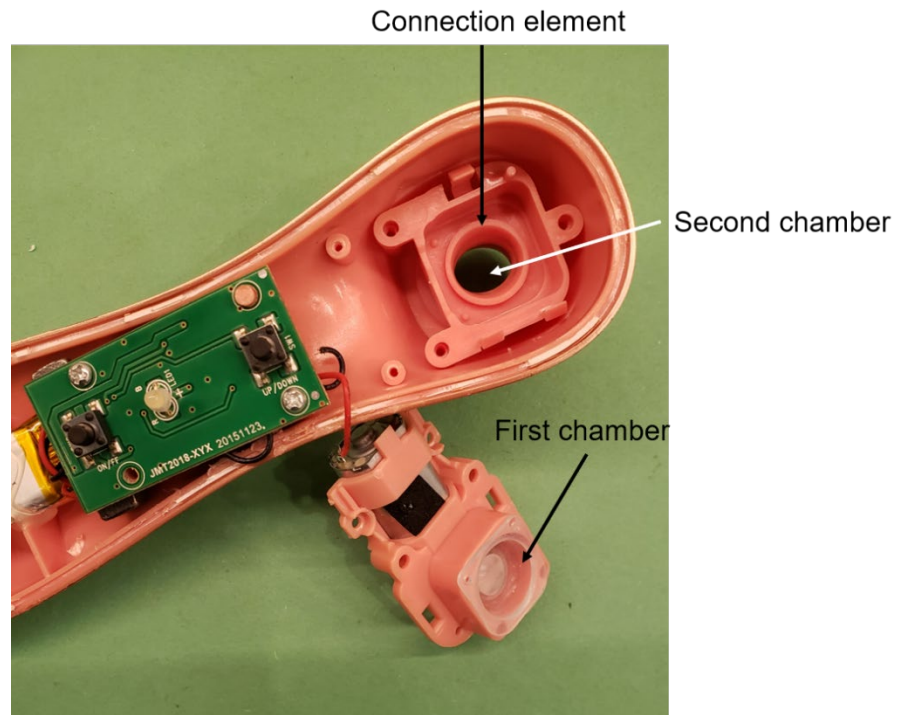
The Satisfyer Pro 2's connection element is rigid and the first and second openings of the connection element are aligned to one another so that a media flow during a compression of the first chamber is directed to the clitoris through the straight channel with a nozzle effect, as shown in the below annotated photographs of a disassembled product:



Claim Language of the '851 Patent	Satisfyer Pro 2
	 <p>The Satisfyer Pro 2 User Manual (page 3, annotated below) describes the device as directed to the clitoris:</p>  <p>Functions/operation</p> <p>To turn your toy on, all you have to do is press the small button at the bottom for 2 seconds to activate the lowest massage setting on the Satisfyer Pro 2.</p> <p>Spread your labia apart a little to free your clitoris. With gentle pressure, place the oval head on your clitoris, making sure the head is situated comfortably in the hollow. Once you've found the ideal position, you won't need to move the toy again.</p> <p>A little secret tip from us: if you use a water-based lubricant such as Waterglide® (www.waterglide.com) it will work even better! This feeling can only be topped by using it underwater as this will make the pulsations even more intense.</p> <p>If you want to increase the intensity, briefly press the larger oval button. Every time you press this button, it will increase the intensity by one level. There are 11 levels of intensity for you to choose from. Once you've reached level 11 you can gradually reduce the intensity again by pressing the larger oval button. The LED on the control panel will remain lit whilst the toy is in use.</p> <p>To turn the toy off, simply hold down the smaller button.</p>

the second opening of the connection element is configured to face the clitoris through the second chamber.

The second opening of the connection element of the Satisfyer Pro 2 is configured to face the clitoris through the second chamber, as shown in the below annotated photographs of a disassembled product:



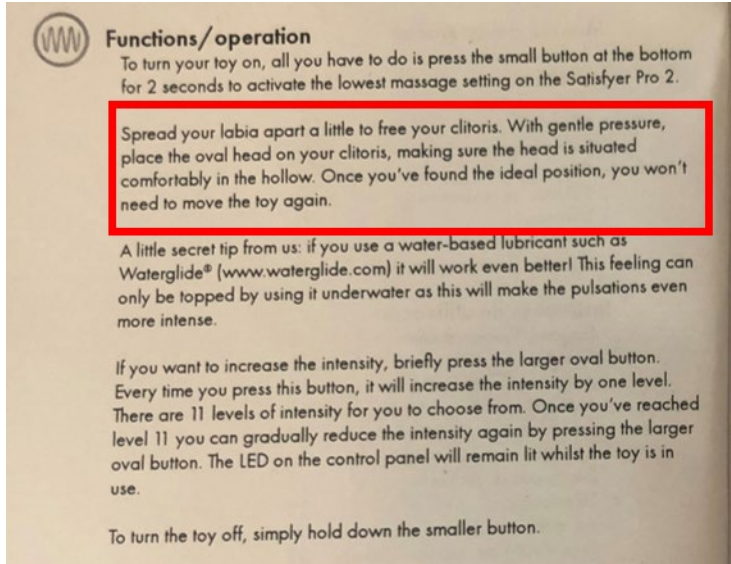
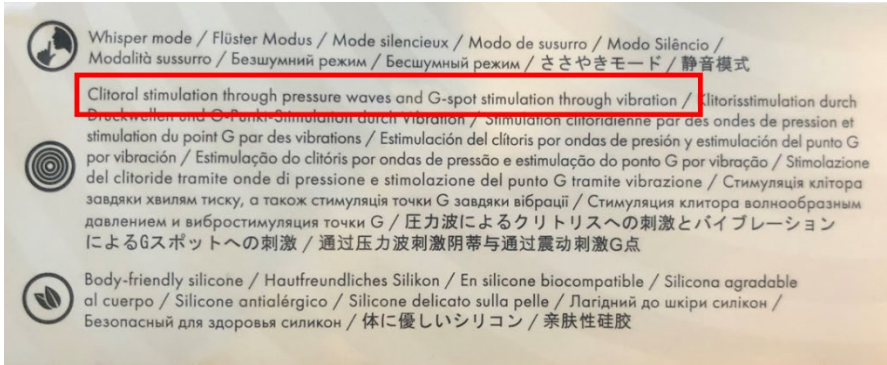
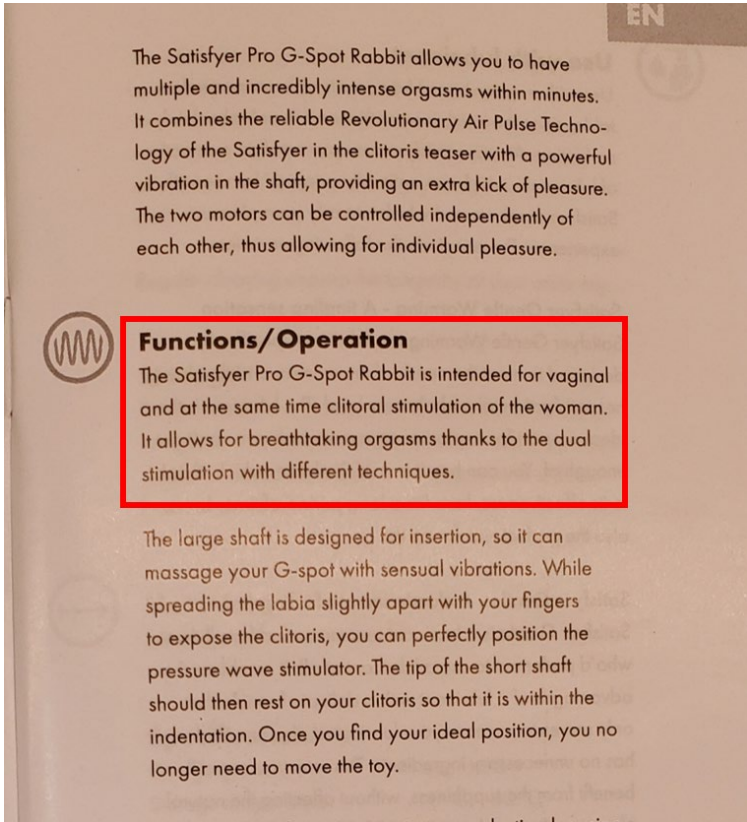
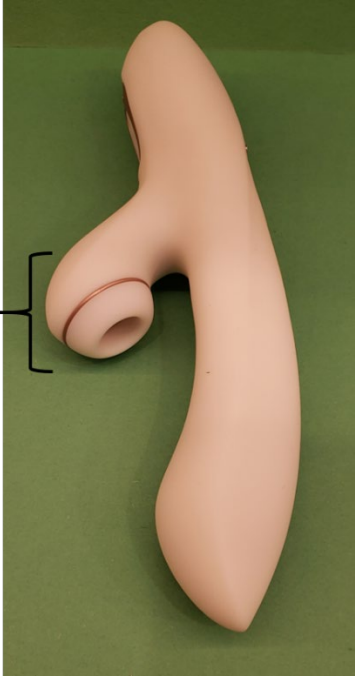
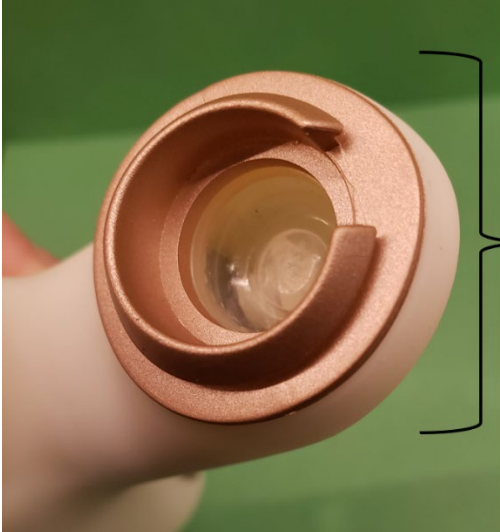
Claim Language of the '851 Patent	Satisfyer Pro 2
	<p>The Satisfyer Pro 2 User Manual (page 3 annotated below) describes the device as configured to face the clitoris through the second chamber:</p>  <p>Functions/operation</p> <p>To turn your toy on, all you have to do is press the small button at the bottom for 2 seconds to activate the lowest massage setting on the Satisfyer Pro 2.</p> <p>Spread your labia apart a little to free your clitoris. With gentle pressure, place the oval head on your clitoris, making sure the head is situated comfortably in the hollow. Once you've found the ideal position, you won't need to move the toy again.</p> <p>A little secret tip from us: if you use a water-based lubricant such as Waterglide® (www.waterglide.com) it will work even better! This feeling can only be topped by using it underwater as this will make the pulsations even more intense.</p> <p>If you want to increase the intensity, briefly press the larger oval button. Every time you press this button, it will increase the intensity by one level. There are 11 levels of intensity for you to choose from. Once you've reached level 11 you can gradually reduce the intensity again by pressing the larger oval button. The LED on the control panel will remain lit whilst the toy is in use.</p> <p>To turn the toy off, simply hold down the smaller button.</p>

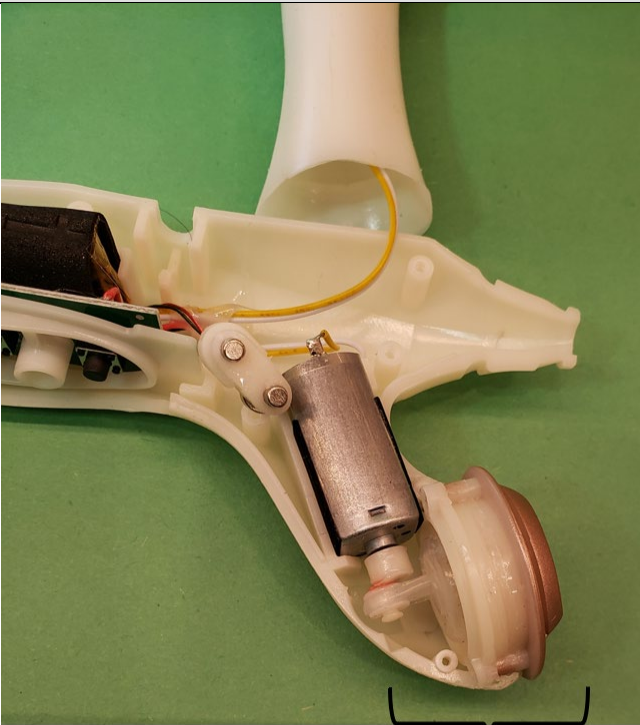
Exhibit 5

REPRESENTATIVE CLAIM CHART 2:
SATISFYER PRO G-SPOT RABBIT AND CLAIM 1 OF U.S. PATENT NO. 9,849,061
(“THE ’061 PATENT”)

Claim Language of the ’061 Patent	Satisfyer Pro G-Spot Rabbit
1. A stimulation device for erogenous zones, comprising:	<p>The Satisfyer Pro G-Spot Rabbit is a stimulation device for erogenous zones.</p> <p>The following packaging shows the Satisfyer Pro G-Spot Rabbit.</p> 

Claim Language of the '061 Patent	Satisfyer Pro G-Spot Rabbit
	<p>The Satisfyer Pro G-Spot Rabbit packaging (annotated below) describes the device as having clitoral stimulation and G-spot stimulation.</p>  <p>The Satisfyer Pro G-Spot Rabbit User Manual (page 5, annotated below) describes the device as a stimulation device for erogenous zones:</p> 

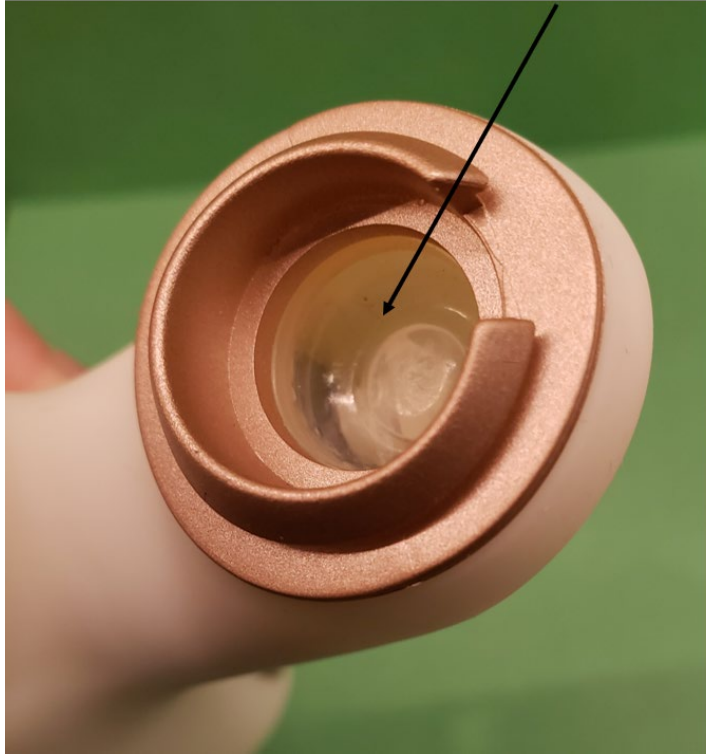
Claim Language of the '061 Patent	Satisfyer Pro G-Spot Rabbit
at least one pressure field generating arrangement with:	<p>The Satisfyer Pro G-Spot Rabbit has a pressure field generating arrangement, as shown in the below annotated photographs of a product (assembled in first image; disassembled in second and third images):</p> <div><p>Pressure field generating arrangement</p></div> <div><p>Pressure field generating arrangement</p></div>

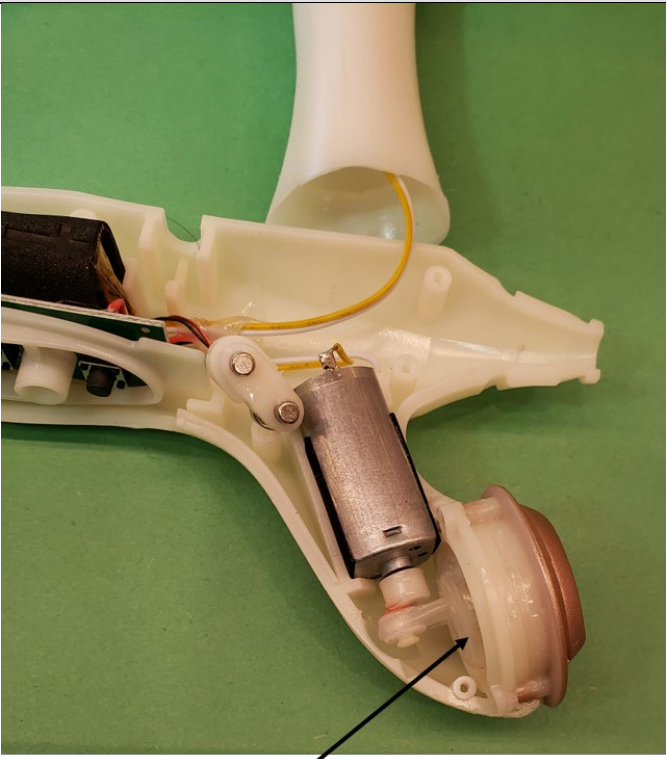
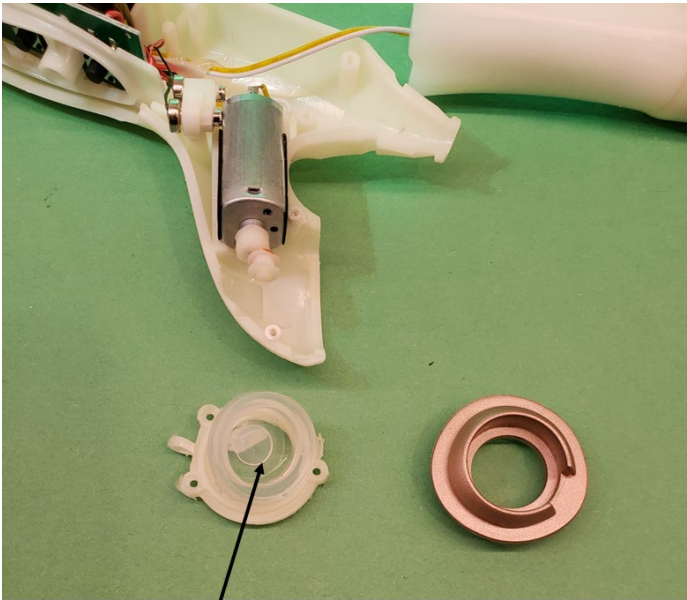
Claim Language of the '061 Patent	Satisfyer Pro G-Spot Rabbit
	<div></div> <div>Pressure field generating arrangement</div>

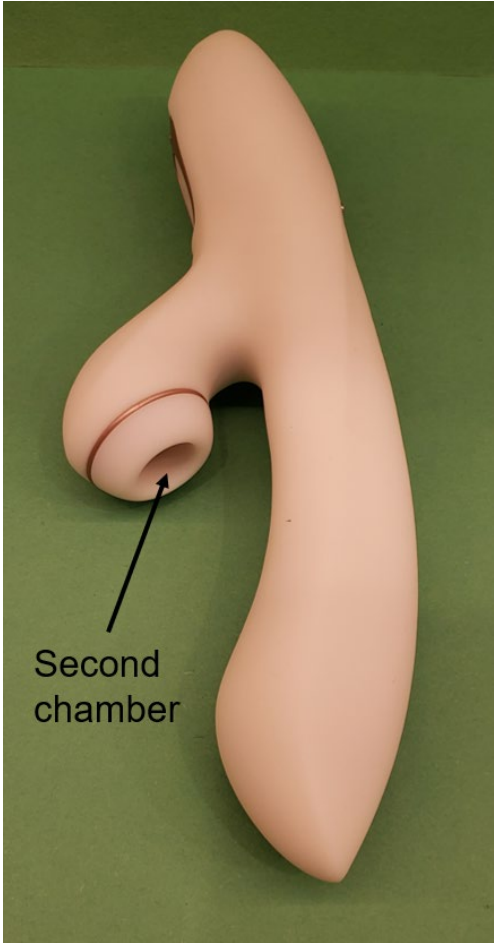
at least one first chamber;

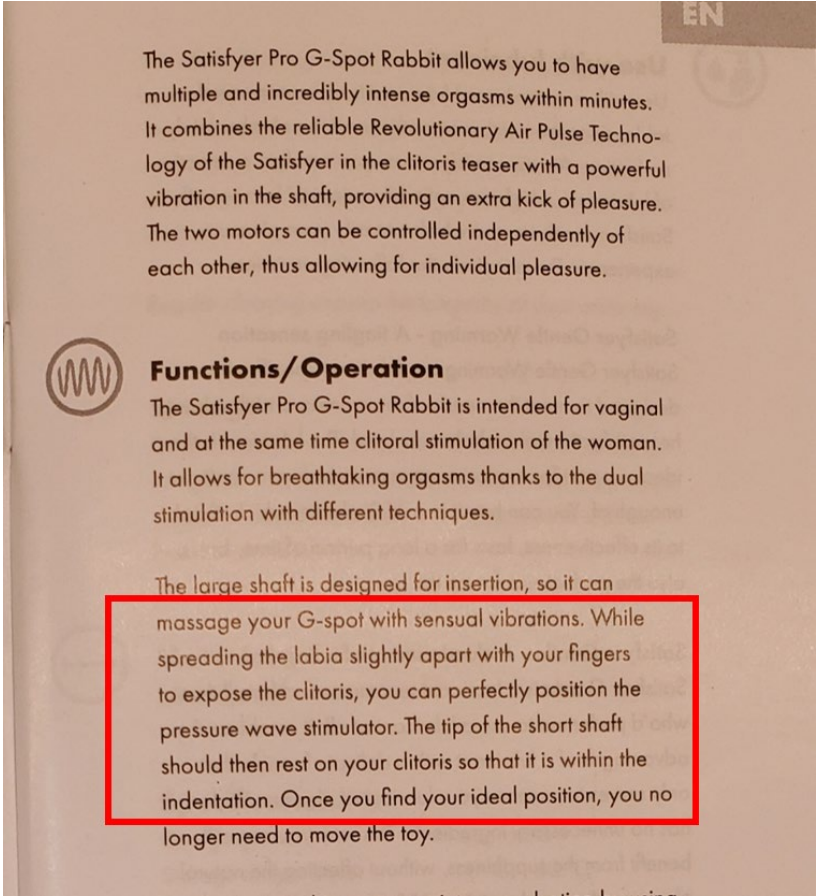
The pressure field generating arrangement of the Satisfyer Pro G-Spot Rabbit includes a first chamber, as shown in the below annotated photographs of a disassembled product.

First chamber



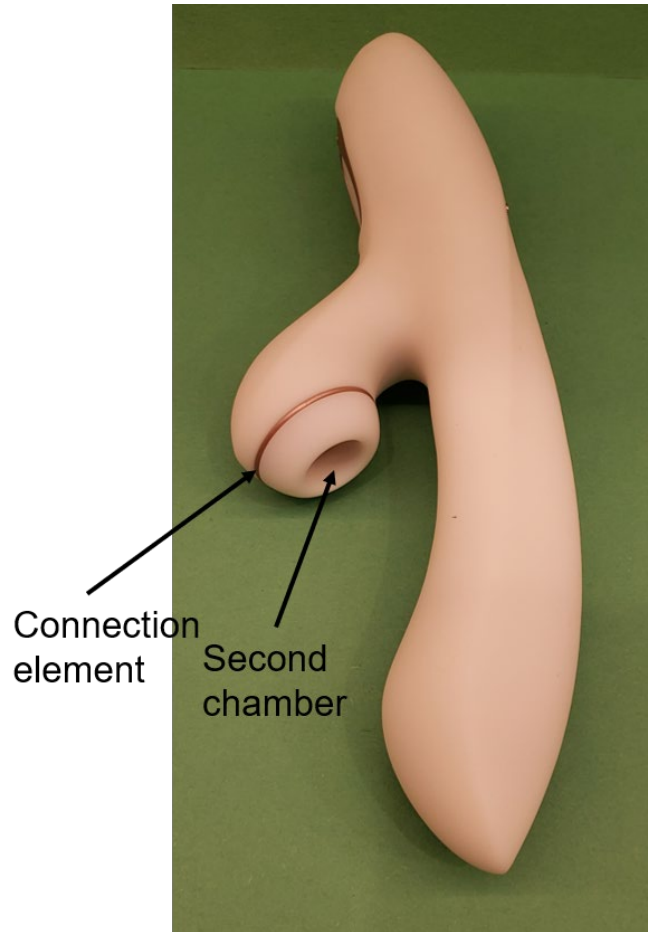
Claim Language of the '061 Patent	Satisfyer Pro G-Spot Rabbit
	<div>A photograph showing the internal components of the Satisfyer Pro G-Spot Rabbit. The device is a white plastic toy with a motor and internal wiring visible. A black arrow points to a specific internal component.</div> <div>First chamber</div> <div>A photograph showing the disassembled internal components of the Satisfyer Pro G-Spot Rabbit. The motor and internal wiring are visible. Below the main assembly, two circular components are shown: a white plastic one and a copper-colored one. A black arrow points to the white plastic component.</div> <div>First chamber</div>

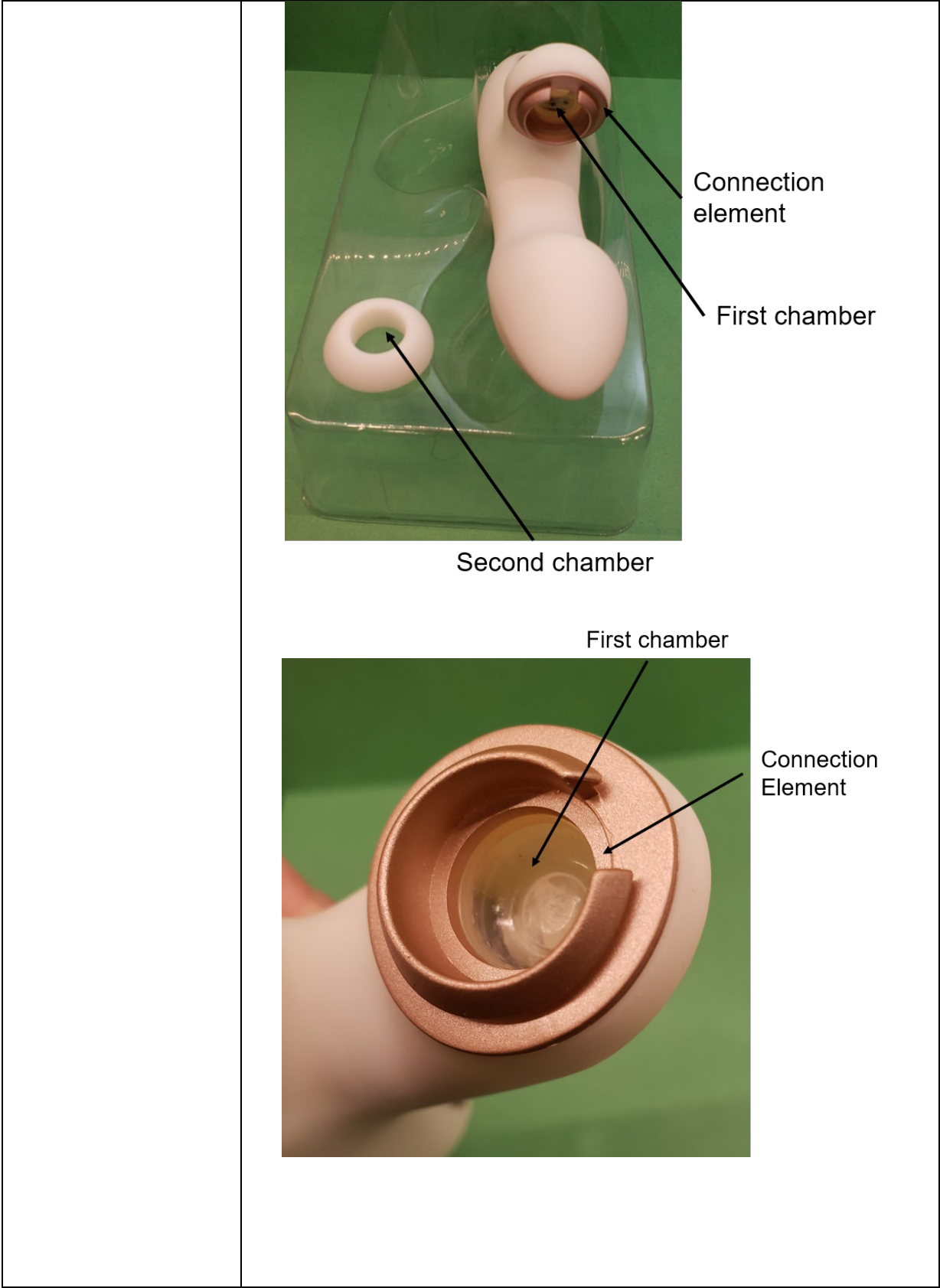
Claim Language of the '061 Patent	Satisfyer Pro G-Spot Rabbit
at least one second chamber having at least one opening for placing on a body part; and	<p>The pressure field generating arrangement of the Satisfyer Pro G-Spot Rabbit includes a second chamber having an opening for placing on a body part, as shown in the below annotated photograph of a product.</p>  <p>Second chamber</p>

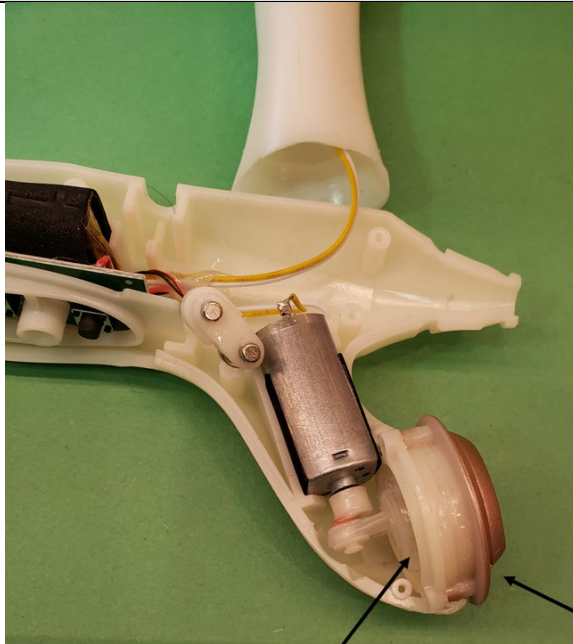
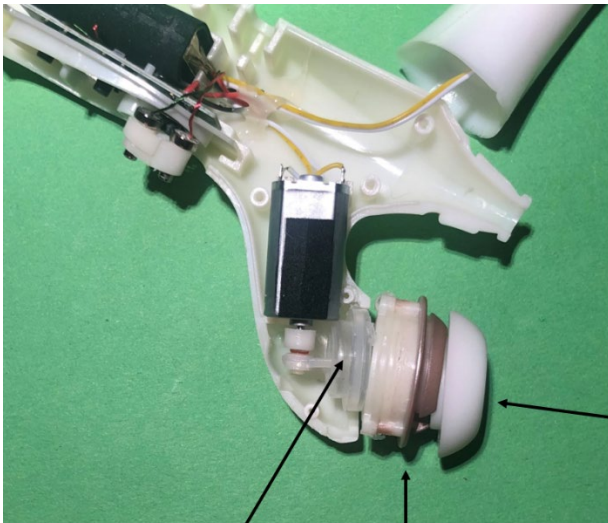
Claim Language of the '061 Patent	Satisfyer Pro G-Spot Rabbit
	<p>The Satisfyer Pro G-Spot Rabbit User Manual (page 5, annotated below) describes the second chamber having an opening for placing on a body part (the clitoris):</p>  <p>The Satisfyer Pro G-Spot Rabbit allows you to have multiple and incredibly intense orgasms within minutes. It combines the reliable Revolutionary Air Pulse Technology of the Satisfyer in the clitoris teaser with a powerful vibration in the shaft, providing an extra kick of pleasure. The two motors can be controlled independently of each other, thus allowing for individual pleasure.</p> <p>Functions/Operation</p> <p>The Satisfyer Pro G-Spot Rabbit is intended for vaginal and at the same time clitoral stimulation of the woman. It allows for breathtaking orgasms thanks to the dual stimulation with different techniques.</p> <p>The large shaft is designed for insertion, so it can massage your G-spot with sensual vibrations. While spreading the labia slightly apart with your fingers to expose the clitoris, you can perfectly position the pressure wave stimulator. The tip of the short shaft should then rest on your clitoris so that it is within the indentation. Once you find your ideal position, you no longer need to move the toy.</p>

at least one connection element that connects the at least one first chamber to the at least one second chamber;

The pressure field generating arrangement of the Satisfyer Pro G-Spot Rabbit includes a connection element that connects the first chamber to the second chamber, as shown in the below annotated photographs of a product (assembled in first image; disassembled in second, third, fourth, and fifth images).

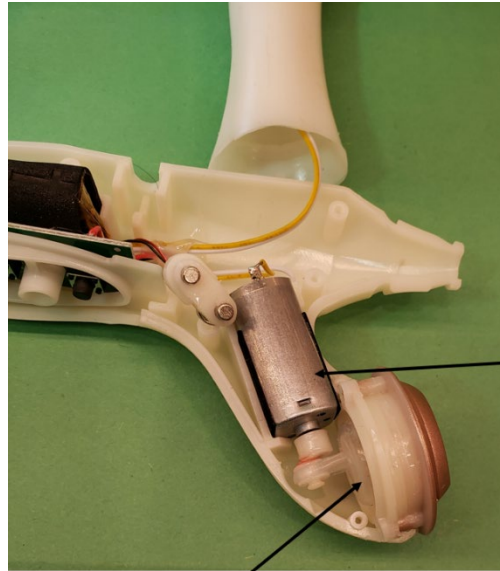




Claim Language of the '061 Patent	Satisfyer Pro G-Spot Rabbit
	<div><p>Connection Element</p><p>First chamber</p></div> <div><p>Second chamber</p><p>First chamber</p><p>Connection element</p></div>

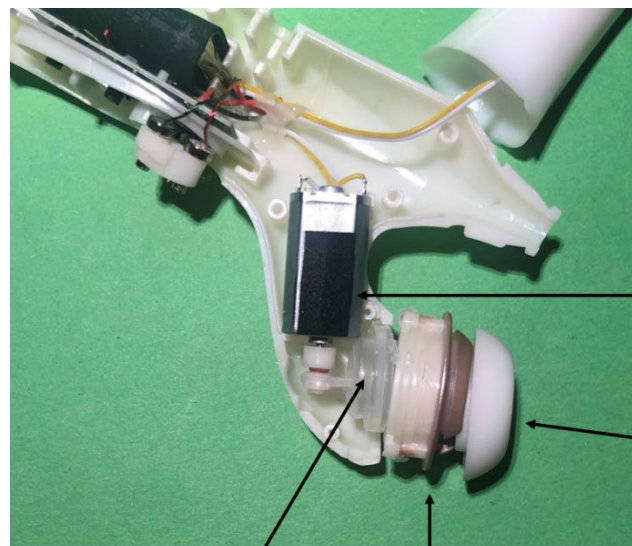
a drive unit that varies the volume of the at least one first chamber such that a stimulating pressure field is generated via the at least one connection element in the at least one second chamber;

The Satisfyer Pro G-Spot Rabbit has a drive unit (*i.e.*, a motor) that varies the volume of the first chamber such that a stimulating pressure field is generated via the connection element in the second chamber, as shown in the below annotated photographs of a disassembled product:



Drive unit

First chamber

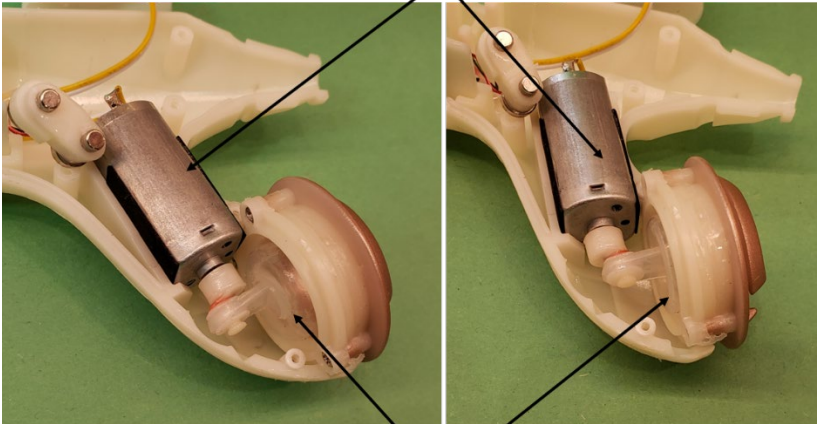


Drive unit

Second chamber

First chamber

Connection element

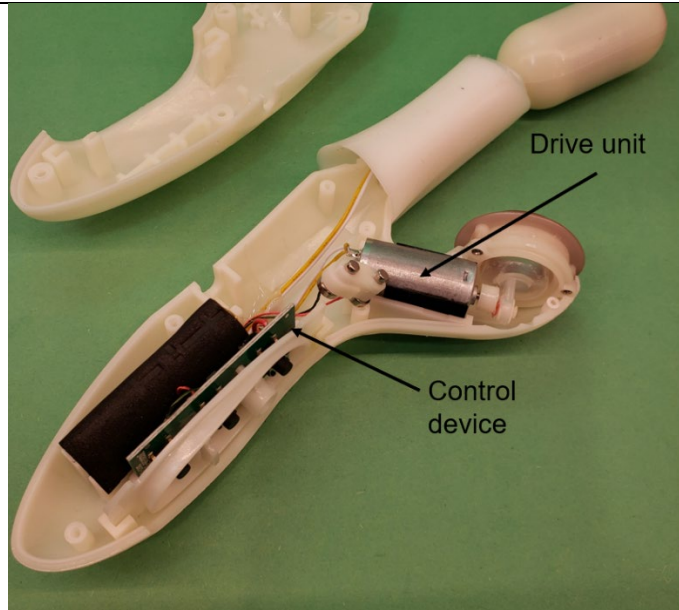
Claim Language of the '061 Patent	Satisfyer Pro G-Spot Rabbit
	<p>Drive unit</p>  <p>First chamber</p>

a control device that activates the drive unit; and

The Satisfyer Pro G-Spot Rabbit has a control device, including a printed circuit board assembly, that activates the drive unit (*i.e.*, motor) inside the device upon activation by the buttons projecting outside of the device housing, as shown in the below annotated photographs of a disassembled product:



Control
device




The Satisfyer Pro G-Spot Rabbit User Manual (page 5, annotated below) describes the drive unit is activated by a control device:

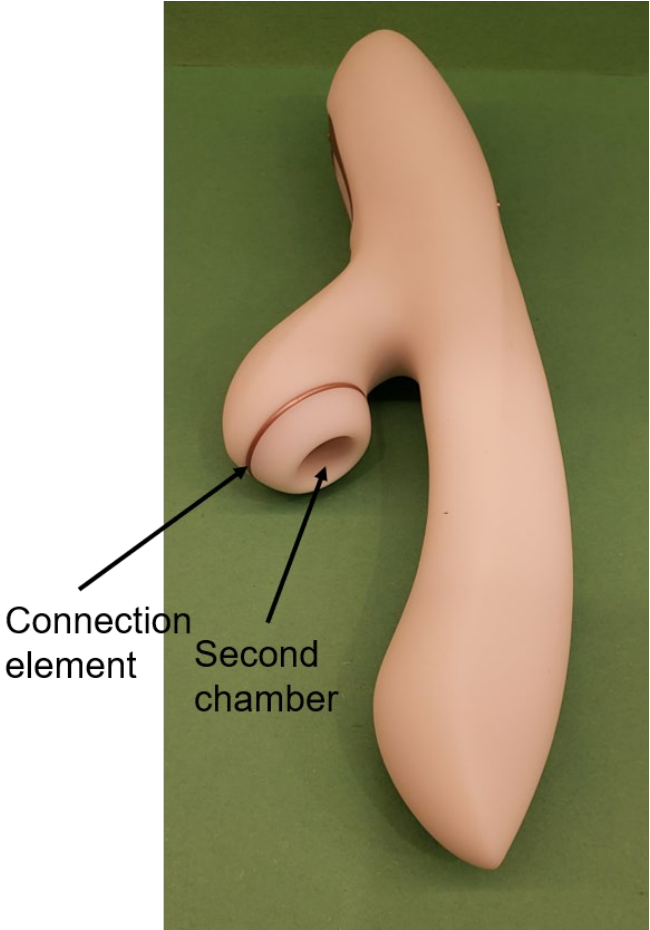
Tip: You can achieve a more intense pulsation by using the Satisfyer Pro G-Spot Rabbit in water (e.g. in the shower or in the bath).

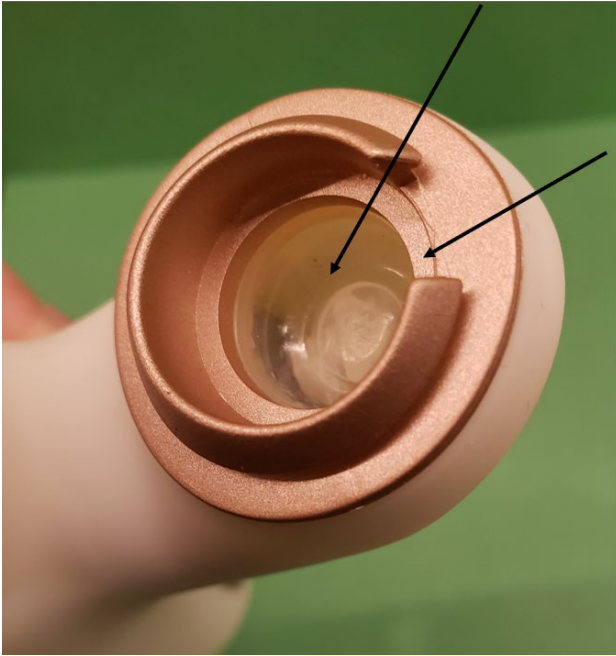
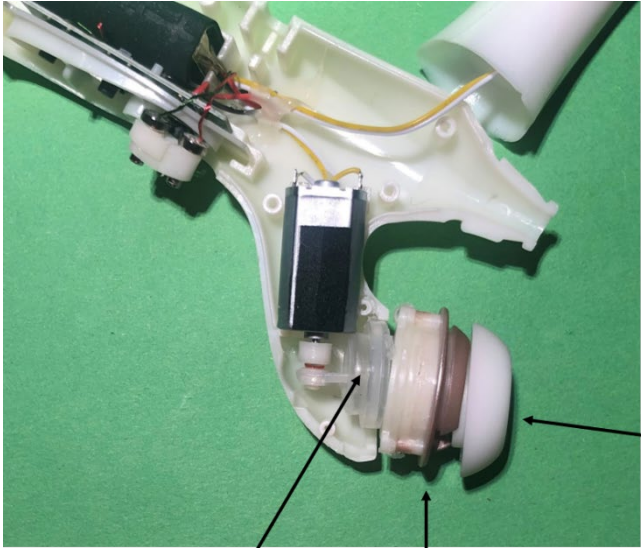
Press the button with 4 waves in the inner, white part of the control area for approx. 2 seconds in order to activate the clitoral pressure wave stimulator at the lowest level. You can then control the intensity via "+" and "-." If you press "+," the intensity increases by a level, if you press "-", the intensity decreases again. Select from 11 levels of intensity. Pressing the button again deactivates the pressure waves.

You can control the vibration programs of the Satisfyer Pro G-Spot Rabbit via the individual wave symbol on the outer button area: Press the button for approx. 2 seconds to activate the vibration. You can change the rhythm with each click and you can choose from 10 programs. Pressing the button again deactivates the vibration.

Claim Language of the '061 Patent	Satisfyer Pro G-Spot Rabbit
an appendage;	<p>The Satisfyer Pro G-Spot Rabbit has an appendage, as shown in the below annotated photograph of a product:</p> <p style="text-align: center;">Appendage</p> 
wherein the stimulating pressure field generated in the at least one second chamber comprises a pattern of negative and positive pressures, modulated onto ¹ with respect to a reference pressure;	<p>The stimulating pressure field generated in the second chamber of the Satisfyer Pro G-Spot Rabbit comprises a pattern of negative and positive pressures modulated with respect to a reference pressure.</p> <p>When the device is in operation, the pressure field generating arrangement generates a stimulating pressure field in the second chamber of the Satisfyer Pro G-Spot Rabbit with a pattern of negative and positive pressures, modulated with respect to a reference pressure (<i>i.e.</i>, ambient pressure). The '061 Patent explains the reference pressure is the prevailing ambient pressure acting on the device prior to placing the stimulation device on the area of the skin. <i>See, e.g.</i>, '061 Patent, col. 3, ll. 38-49; col. 14, ll. 49-57.</p>

¹ The claims were amended during prosecution to remove the word “onto.” However, the printed '061 Patent erroneously included the term “onto.”

Claim Language of the '061 Patent	Satisfyer Pro G-Spot Rabbit
wherein the at least one first chamber is connected to the at least one second chamber solely by the at least one connection element, and	<p>The first chamber of the Satisfyer Pro G-Spot Rabbit is connected to the second chamber solely by the connection element, as shown in the annotated photographs of a product (assembled, first image; disassembled, second and third images):</p>  <p>The photograph shows a pink, Y-shaped vibrator against a green background. Two black arrows point to specific features: one points to a small circular opening on the side of the bulbous part, labeled 'Connection element', and the other points to the interior of this opening, labeled 'Second chamber'.</p>

Claim Language of the '061 Patent	Satisfyer Pro G-Spot Rabbit
	<div>First chamber</div> <div>A close-up photograph of the internal components of the Satisfyer Pro G-Spot Rabbit. It shows a copper-colored, cup-like structure with a central, clear, dome-shaped component. Two black arrows point to the top rim of the cup and the central dome.</div> <div>Connection Element</div> <div>A photograph showing the disassembled internal components of the Satisfyer Pro G-Spot Rabbit. The components are laid out on a green surface. A black battery pack is visible at the top. Below it, a white plastic housing contains various electronic components and wiring. At the bottom, a copper-colored cup-like structure is shown, which is the first chamber. A clear, dome-shaped component is attached to the cup, which is the connection element. A white, bulbous component is attached to the connection element, which is the second chamber. Three black arrows point to the cup, the connection element, and the bulbous component.</div> <div>Second chamber</div> <div>First chamber</div> <div>Connection element</div>



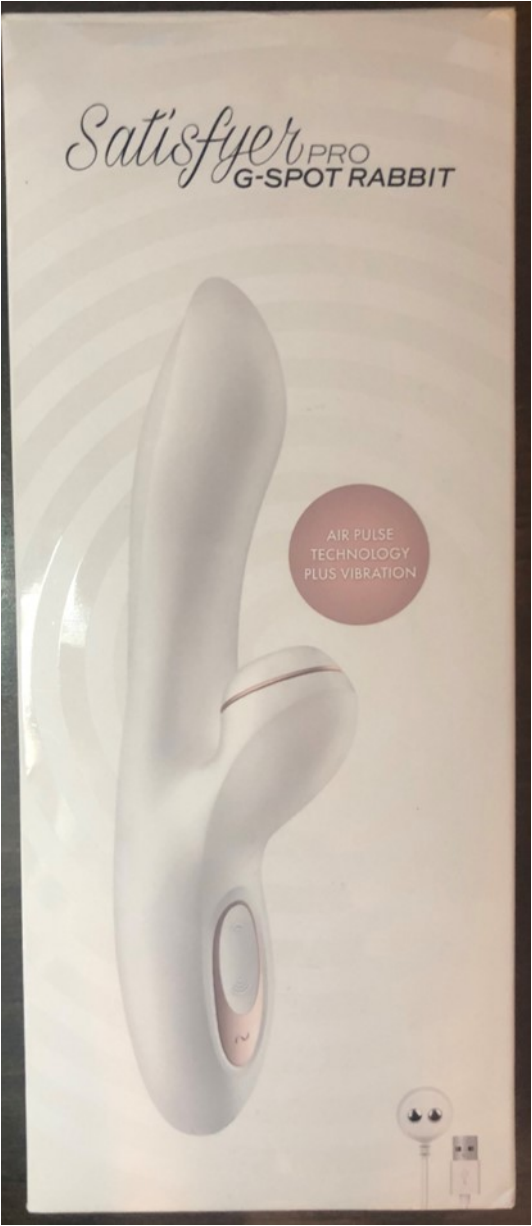
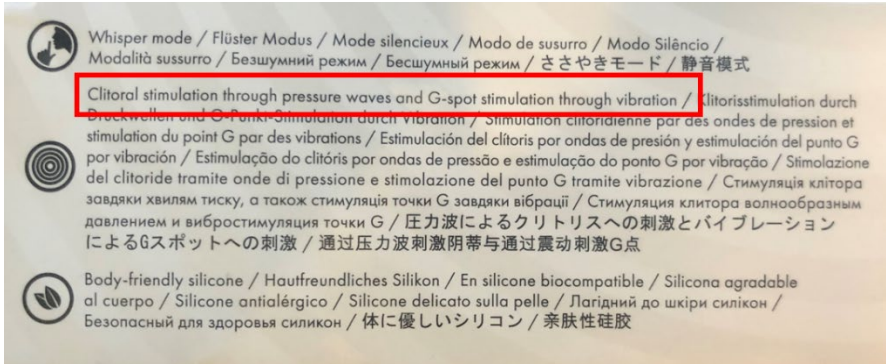
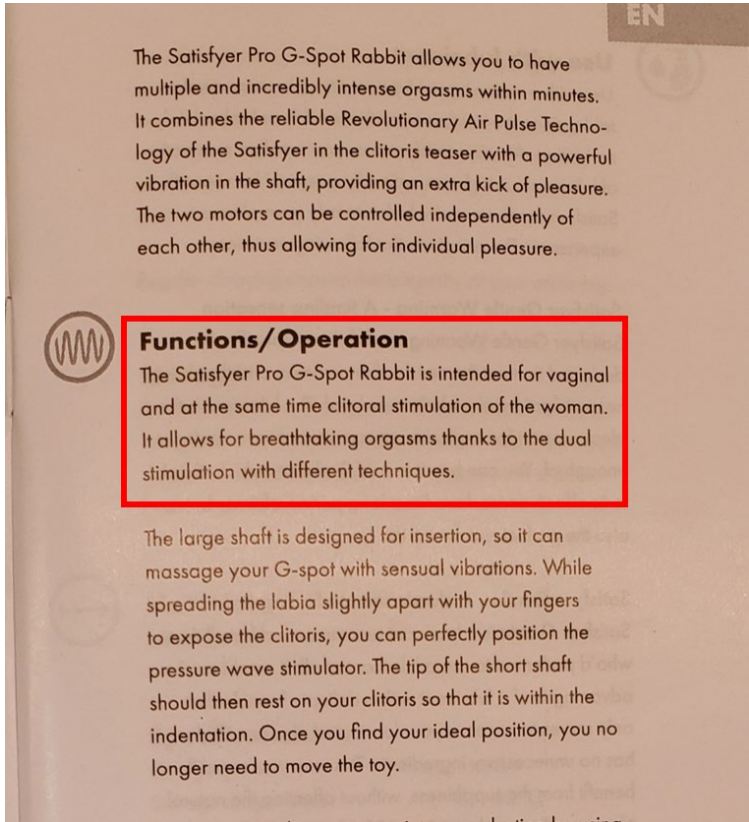
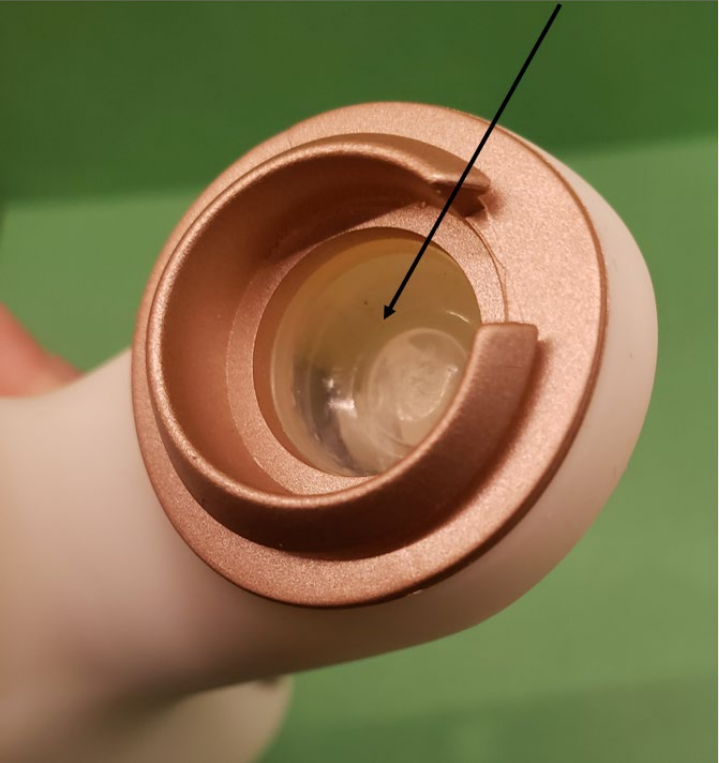
Claim Language of the '061 Patent	Satisfyer Pro G-Spot Rabbit
<p>wherein the appendage is a dildo configured to be inserted into a vagina.</p>	<p>The appendage of the Satisfyer Pro G-Spot Rabbit is a dildo configured to be inserted into a vagina, as shown in the annotated photograph of a Satisfyer Pro G-Spot Rabbit.</p> <p style="text-align: center;">Dildo</p>  <p>The Satisfyer Pro G-Spot Rabbit User Manual (page 5, annotated below) describes the device having a dildo configured to be inserted into a vagina:</p> <div> <p>The Satisfyer Pro G-Spot Rabbit allows you to have multiple and incredibly intense orgasms within minutes. It combines the reliable Revolutionary Air Pulse Technology of the Satisfyer in the clitoris teaser with a powerful vibration in the shaft, providing an extra kick of pleasure. The two motors can be controlled independently of each other, thus allowing for individual pleasure.</p> <p> Functions/Operation</p> <p>The Satisfyer Pro G-Spot Rabbit is intended for vaginal and at the same time clitoral stimulation of the woman. It allows for breathtaking orgasms thanks to the dual stimulation with different techniques.</p> <p>The large shaft is designed for insertion, so it can massage your G-spot with sensual vibrations. While spreading the labia slightly apart with your fingers to expose the clitoris, you can perfectly position the pressure wave stimulator. The tip of the short shaft should then rest on your clitoris so that it is within the indentation. Once you find your ideal position, you no longer need to move the toy.</p> </div>

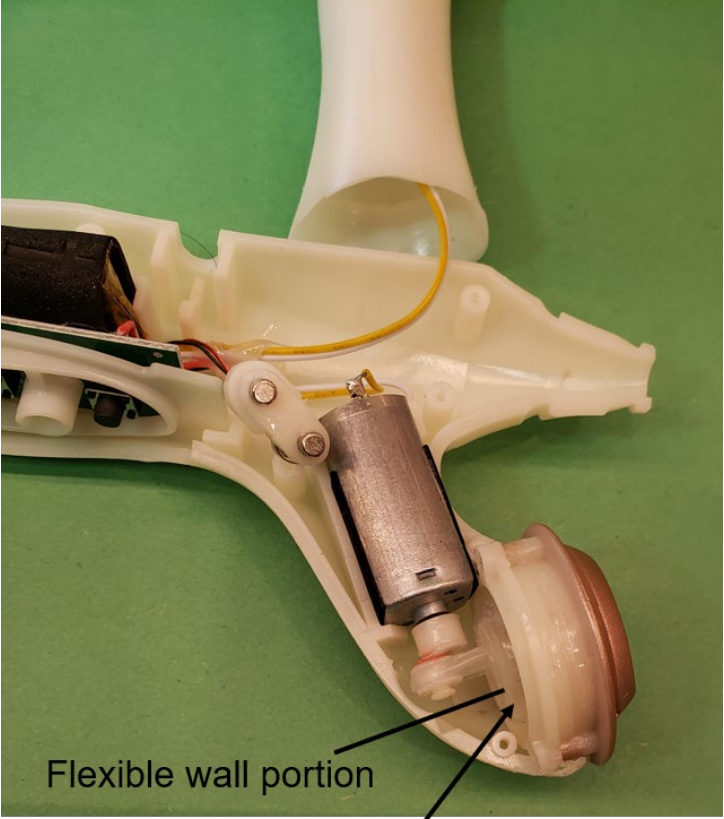
Exhibit 6

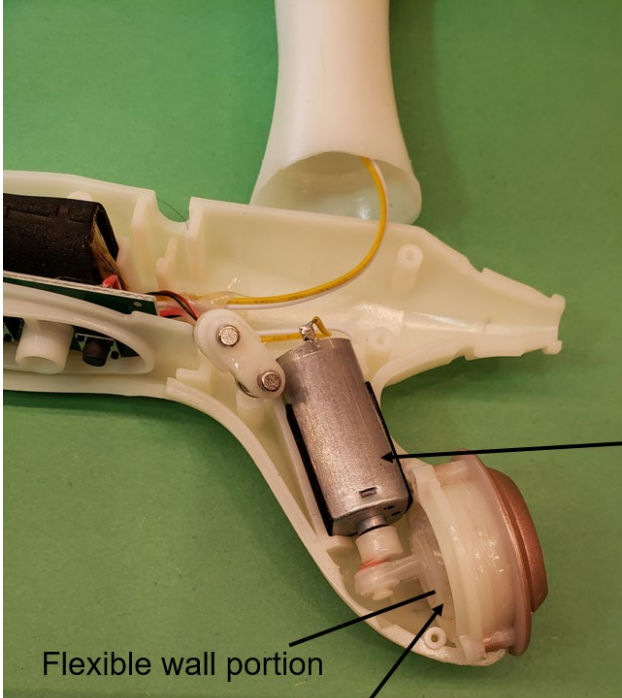
REPRESENTATIVE CLAIM CHART 3:
SATISFYER PRO G-SPOT RABBIT AND CLAIM 1 OF U.S. PATENT NO. 9,937,097
(“THE ’097 PATENT”)

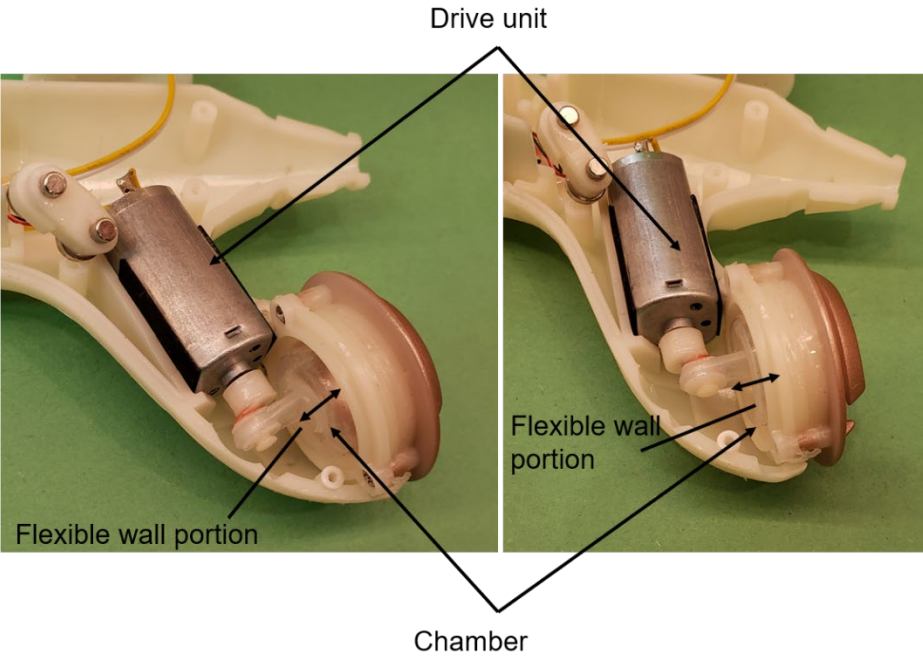
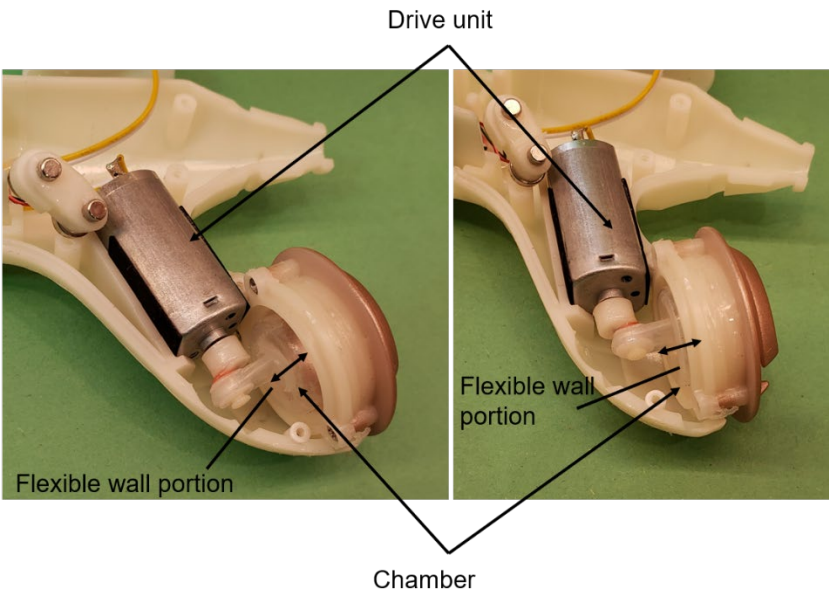
Claim Language of the '097 Patent	Satisfyer Pro G-Spot Rabbit
1. A stimulation device, comprising:	<p>The Satisfyer Pro G-Spot Rabbit is a stimulation device.</p> <p>The following packaging shows the Satisfyer Pro G-Spot Rabbit.</p> 

Claim Language of the '097 Patent	Satisfyer Pro G-Spot Rabbit
	<p>The Satisfyer Pro G-Spot Rabbit packaging (annotated below) describes the device as having clitoral stimulation and G-spot stimulation.</p>  <p>The Satisfyer Pro G-Spot Rabbit User Manual (page 5, annotated below) describes the device as a stimulation device:</p> 

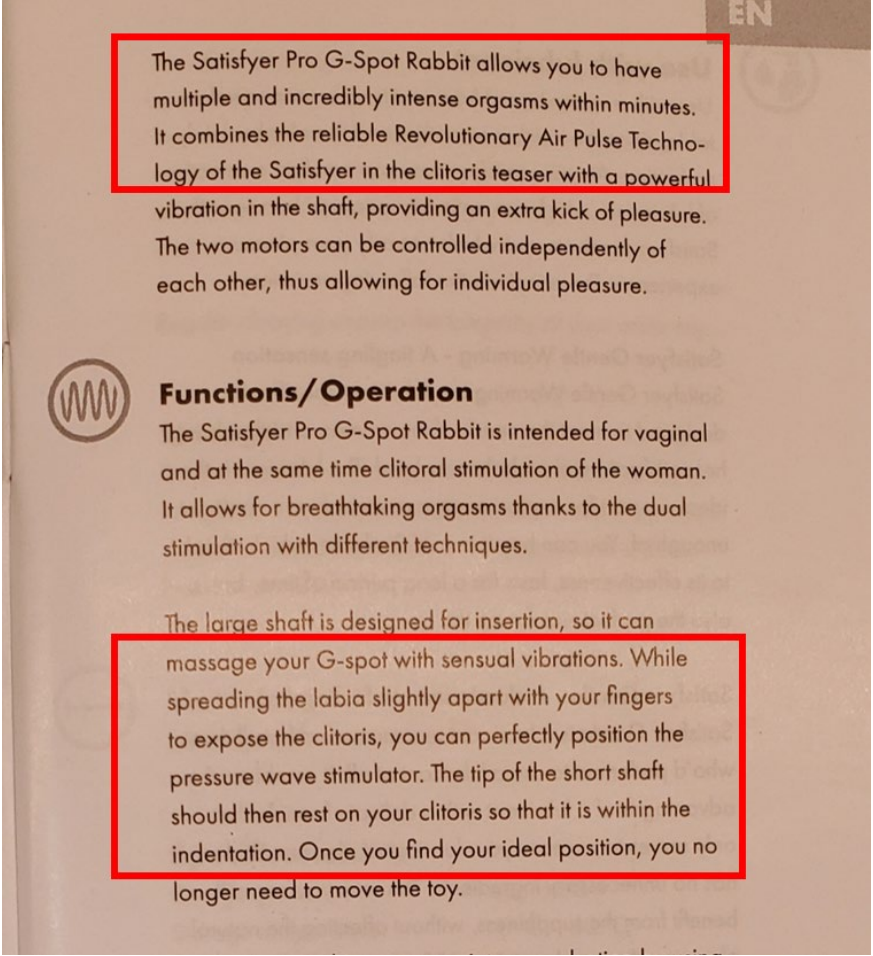

Claim Language of the '097 Patent	Satisfyer Pro G-Spot Rabbit
a chamber having a flexible wall portion;	<p>The Satisfyer Pro G-Spot Rabbit includes a chamber having a flexible wall portion, as shown in the below annotated photographs of a disassembled product:</p> <div><p>Chamber</p>A close-up photograph of the internal components of a disassembled Satisfyer Pro G-Spot Rabbit. The image shows a copper-colored, cylindrical outer shell with a white inner component. A black arrow points from the word "Chamber" to a clear, flexible, bulbous wall portion inside the shell. The background is a solid green color.</div>

Claim Language of the '097 Patent	Satisfyer Pro G-Spot Rabbit
	 <p>Flexible wall portion</p> <p>Chamber</p>

Claim Language of the '097 Patent	Satisfyer Pro G-Spot Rabbit
<p>a drive unit in physical communication with the flexible wall portion so as to cause deflections of the flexible wall portion in opposing directions, thereby resulting in a changing volume of the chamber,</p>	<p>The Satisfyer Pro G-Spot Rabbit includes a drive unit in physical communication with the flexible wall portion so as to cause deflections of the flexible wall portion in opposing directions, thereby resulting in a changing volume of the chamber, as shown in the below annotated photographs of a disassembled product.</p>  <p>The photograph shows a disassembled white plastic device. A cylindrical motor, labeled 'Drive unit', is connected to a yellow wire. It is positioned next to a curved, translucent plastic part labeled 'Flexible wall portion'. Below this, a cavity is labeled 'Chamber'. Arrows point from the text labels to the corresponding parts in the image.</p>

Claim Language of the '097 Patent	Satisfyer Pro G-Spot Rabbit
	 <p>Drive unit</p> <p>Flexible wall portion</p> <p>Chamber</p>
<p>the changing volume of the chamber resulting in modulated positive and negative pressures with respect to a reference pressure;</p>	<p>The changing volume of the chamber of the Satisfyer Pro G-Spot Rabbit results in modulated positive and negative pressures with respect to a reference pressure.</p> <p>The below annotated photographs of a disassembled product show the changing volume of the chamber.</p>  <p>Drive unit</p> <p>Flexible wall portion</p> <p>Chamber</p>

Claim Language of the '097 Patent	Satisfyer Pro G-Spot Rabbit
	<p>When the device is in operation, the changing volume of the chamber of the Satisfyer Pro G-Spot Rabbit results in modulated positive and negative pressures with respect to a reference pressure (<i>i.e.</i>, ambient pressure). The '097 Patent explains the reference pressure is the prevailing ambient pressure acting on the device prior to placing the stimulation device on the area of the skin. <i>See, e.g.</i>, '097 Patent, col. 5, ll. 17-27; col. 15, ll. 32-40.</p>
<p>an opening for applying the modulated positive and negative pressures to a body part;</p>	<p>The Satisfyer Pro G-Spot Rabbit has an opening for applying the modulated positive and negative pressures to a body part, as shown in the below annotated photograph of a product.</p> <div> </div> <p>The Satisfyer Pro G-Spot Rabbit User Manual (page 5, annotated below) describes the application of the modulated positive and negatives pressures to a body part (the clitoris) through the opening:</p>

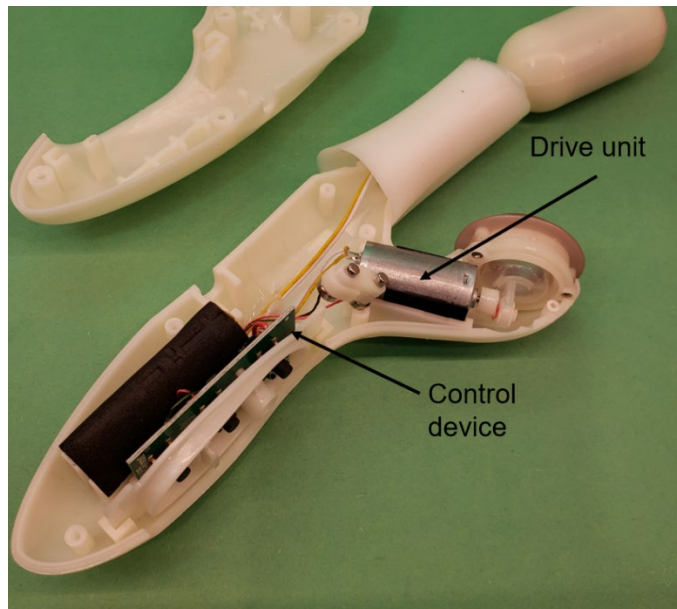
Claim Language of the '097 Patent	Satisfyer Pro G-Spot Rabbit
	 <p>The Satisfyer Pro G-Spot Rabbit allows you to have multiple and incredibly intense orgasms within minutes. It combines the reliable Revolutionary Air Pulse Technology of the Satisfyer in the clitoris teaser with a powerful vibration in the shaft, providing an extra kick of pleasure. The two motors can be controlled independently of each other, thus allowing for individual pleasure.</p> <p> Functions/Operation</p> <p>The Satisfyer Pro G-Spot Rabbit is intended for vaginal and at the same time clitoral stimulation of the woman. It allows for breathtaking orgasms thanks to the dual stimulation with different techniques.</p> <p>The large shaft is designed for insertion, so it can massage your G-spot with sensual vibrations. While spreading the labia slightly apart with your fingers to expose the clitoris, you can perfectly position the pressure wave stimulator. The tip of the short shaft should then rest on your clitoris so that it is within the indentation. Once you find your ideal position, you no longer need to move the toy.</p>

a control device for controlling the drive unit; and

The Satisfyer Pro G-Spot Rabbit has a control device, including a printed circuit board assembly, for controlling the drive unit (*i.e.*, motor) inside the device upon activation by the buttons projecting outside of the device housing, as shown in the below annotated photographs of a disassembled product:

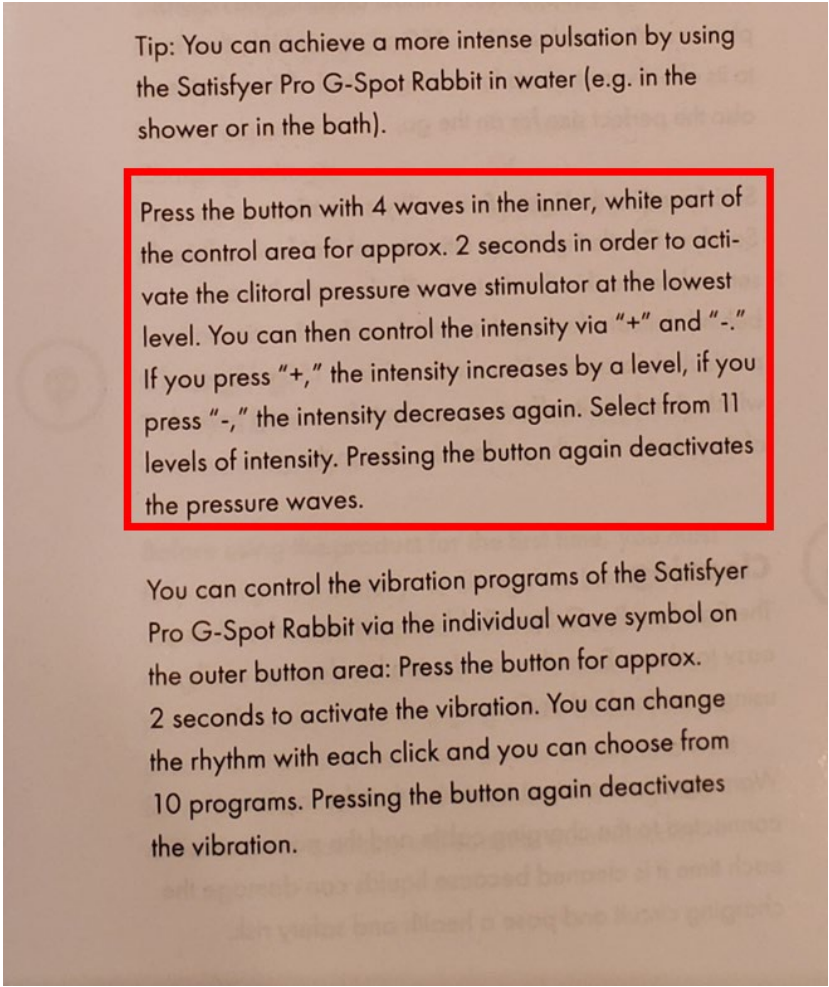


Control device



Drive unit

Control device

Claim Language of the '097 Patent	Satisfyer Pro G-Spot Rabbit
	<p>The Satisfyer Pro G-Spot Rabbit User Manual (page 5, annotated below) describes controlling the drive unit with a control device:</p>  <p>Tip: You can achieve a more intense pulsation by using the Satisfyer Pro G-Spot Rabbit in water (e.g. in the shower or in the bath).</p> <p>Press the button with 4 waves in the inner, white part of the control area for approx. 2 seconds in order to activate the clitoral pressure wave stimulator at the lowest level. You can then control the intensity via "+" and "-." If you press "+," the intensity increases by a level, if you press "-", the intensity decreases again. Select from 11 levels of intensity. Pressing the button again deactivates the pressure waves.</p> <p>You can control the vibration programs of the Satisfyer Pro G-Spot Rabbit via the individual wave symbol on the outer button area: Press the button for approx. 2 seconds to activate the vibration. You can change the rhythm with each click and you can choose from 10 programs. Pressing the button again deactivates the vibration.</p>

Claim Language of the '097 Patent	Satisfyer Pro G-Spot Rabbit
<p>an appendage, wherein the appendage is a dildo configured to be inserted into a vagina.</p>	<p>The Satisfyer Pro G-Spot Rabbit has an appendage, wherein the appendage is a dildo configured to be inserted into a vagina, as shown in the below annotated photograph of a product:</p> <div> </div> <p>The Satisfyer Pro G-Spot Rabbit User Manual (page 5, annotated below) describes the device having a dildo configured to be inserted into a vagina:</p> <div> </div>

Exhibit 7



US011090220B2

(12) **United States Patent**
Lenke

(10) **Patent No.:** **US 11,090,220 B2**

(45) **Date of Patent:** ***Aug. 17, 2021**

(54) **STIMULATION DEVICE**

(71) Applicant: **NOVOLUTO GmbH**, Berlin (DE)

(72) Inventor: **Michael Lenke**, Metten (DE)

(73) Assignee: **NOVOLUTO GBHH**, Berlin (DE)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **15/965,117**

(22) Filed: **Apr. 27, 2018**

(65) **Prior Publication Data**

US 2018/0243161 A1 Aug. 30, 2018

Related U.S. Application Data

(63) Continuation of application No. 15/354,599, filed on Nov. 17, 2016, which is a continuation of application (Continued)

(30) **Foreign Application Priority Data**

Sep. 23, 2013 (DE) 102013110501.7

(51) **Int. Cl.**

A61H 19/00 (2006.01)

A61H 9/00 (2006.01)

(52) **U.S. Cl.**

CPC **A61H 19/34** (2013.01); **A61H 9/00** (2013.01); **A61H 9/005** (2013.01); **A61H 9/0007** (2013.01);

(Continued)

(58) **Field of Classification Search**

CPC .. **A61H 9/00**; **A61H 9/005**; **A61H 2009/0064**; **A61H 19/30**; **A61H 19/34**;

(Continued)

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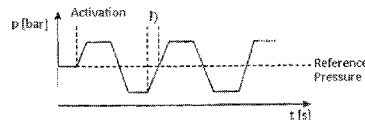
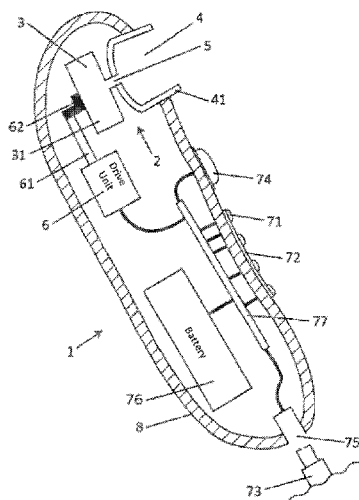
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(57) **ABSTRACT**

A stimulation device is provided in accordance with one embodiment. The stimulation device includes a chamber which has a flexible wall portion. A drive unit of the stimulation device is in physical communication with the flexible wall portion so as to cause deflections of the flexible wall portion in opposing directions, thereby resulting in a changing volume of the chamber. The changing volume of the chamber results in modulated positive and negative pressures with respect to a reference pressure. An opening of the stimulation device is for applying the modulated positive and negative pressures to a body part. The stimulation device includes a control device for controlling the drive unit.

31 Claims, 7 Drawing Sheets



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Related U.S. Application Data

No. 15/023,471, filed as application No. PCT/EP2014/065734 on Jul. 22, 2014, now Pat. No. 9,763,851.

(52) U.S. Cl.

CPC *A61H 9/0057* (2013.01); *A61H 19/00* (2013.01); *A61H 19/30* (2013.01); *A61H 2201/0153* (2013.01); *A61H 2201/0157* (2013.01); *A61H 2201/1207* (2013.01); *A61H 2201/1215* (2013.01); *A61H 2201/1238* (2013.01); *A61H 2201/1409* (2013.01)

(58) Field of Classification Search

CPC *A61H 19/50*; *A61H 23/02*; *A61H 23/0254*; *A61H 2205/087*

See application file for complete search history.

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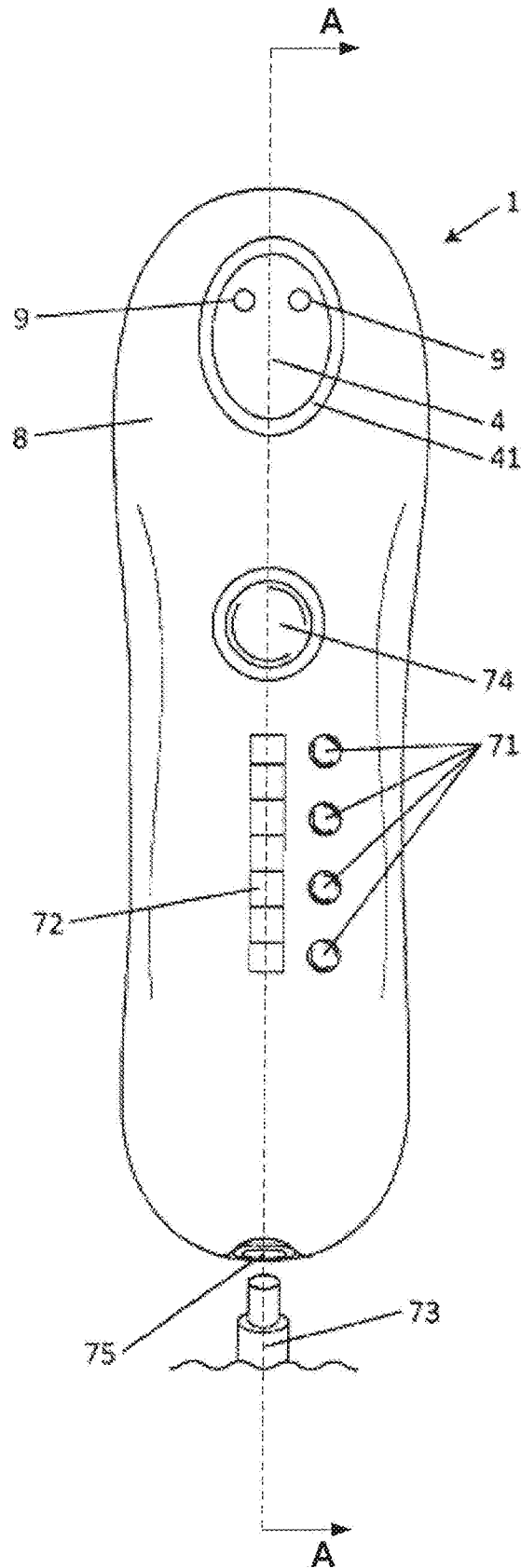
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Fig. 1



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Fig. 2

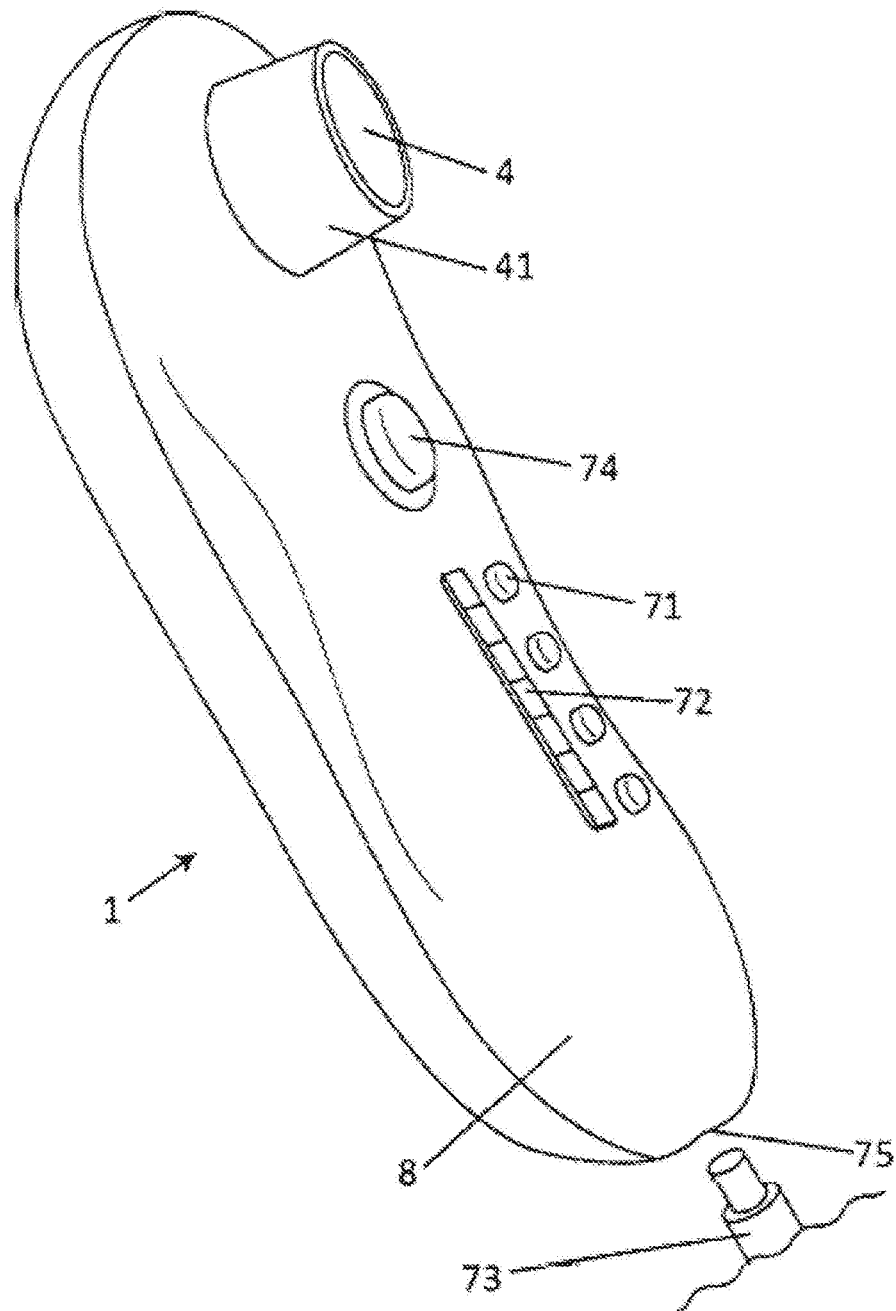


Fig. 3

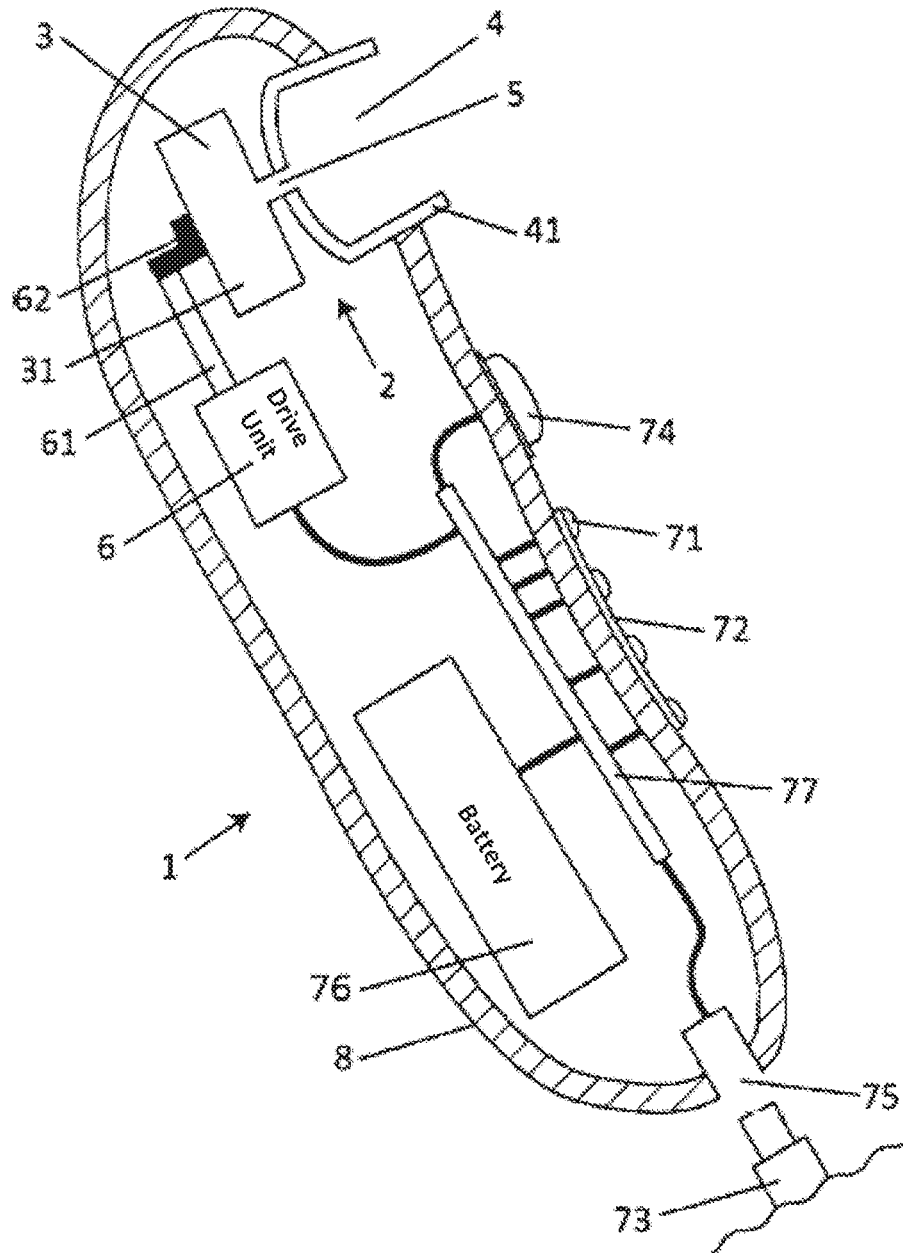


Fig. 4

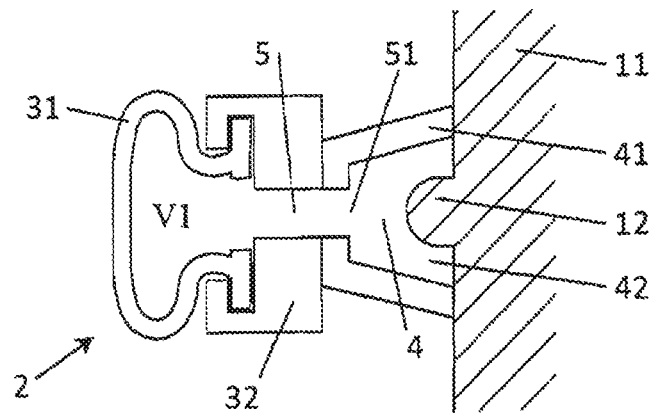


Fig. 5

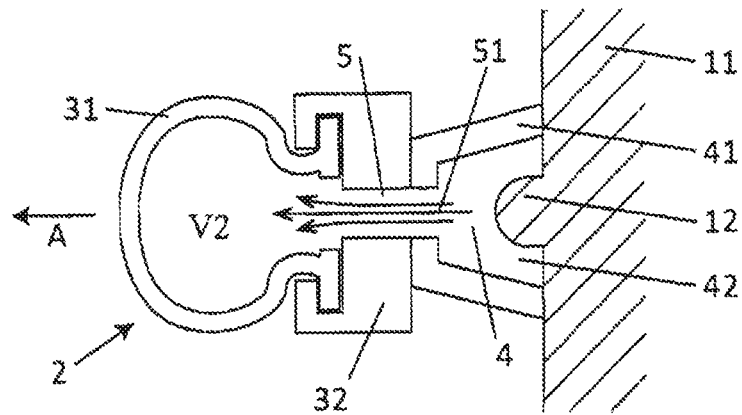


Fig. 6

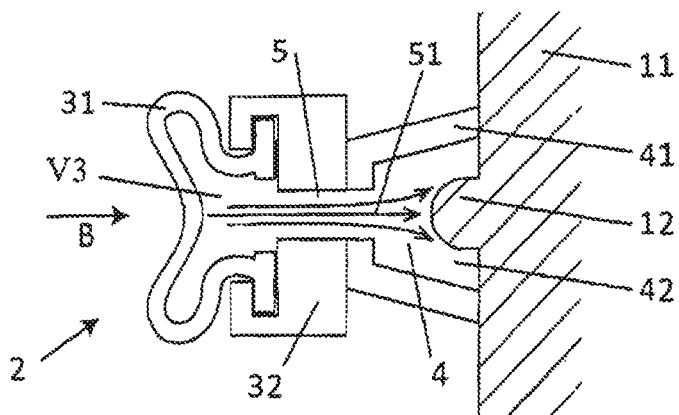


Fig. 7

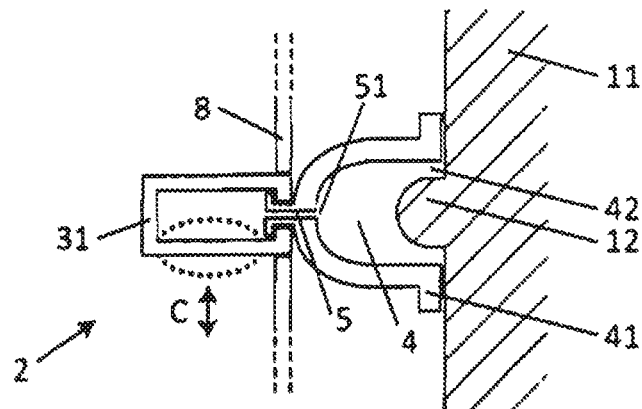


Fig. 8

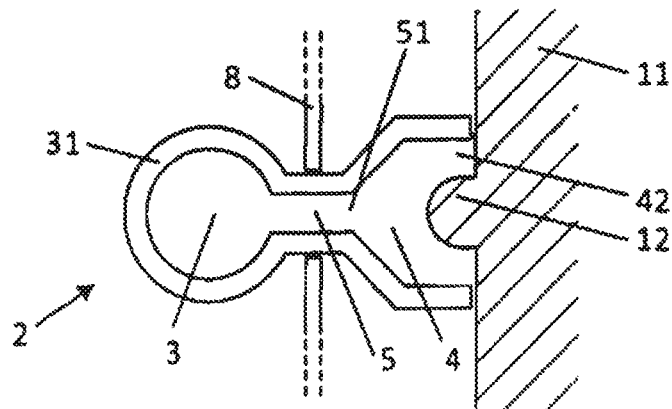


Fig. 9

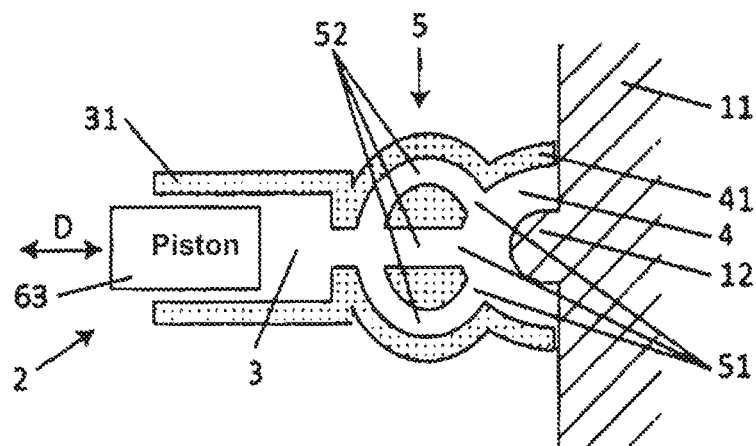


Fig. 10a

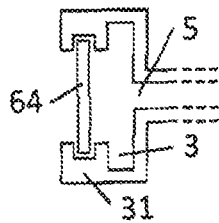


Fig. 10b

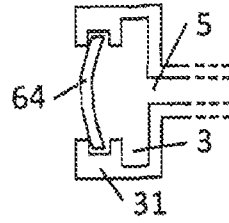


Fig. 10c

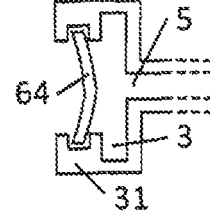


Fig. 11

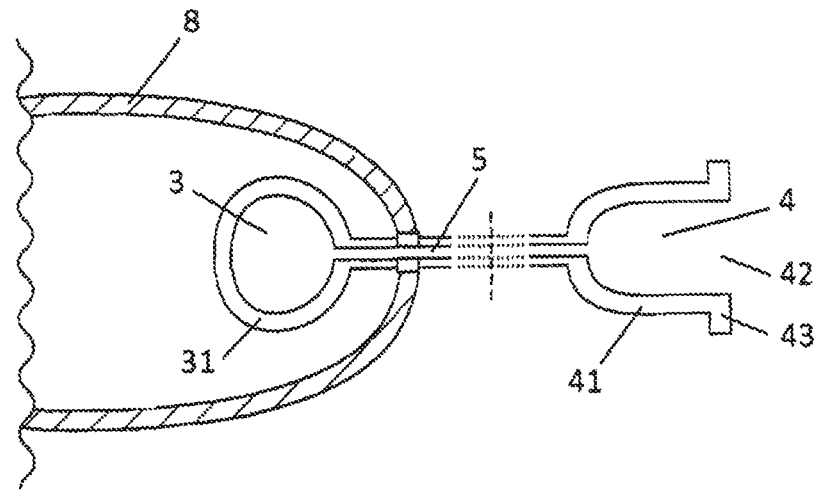


Fig. 12a

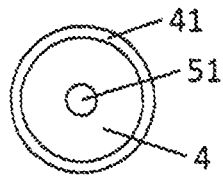


Fig. 12b

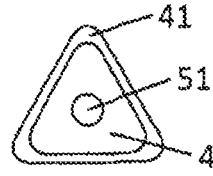


Fig. 12c

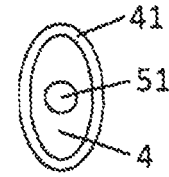


Fig. 12d

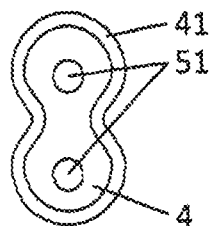


Fig. 12e

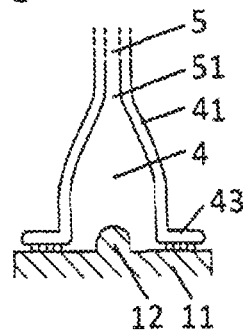


Fig. 12f

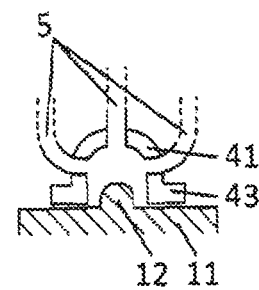


Fig. 13

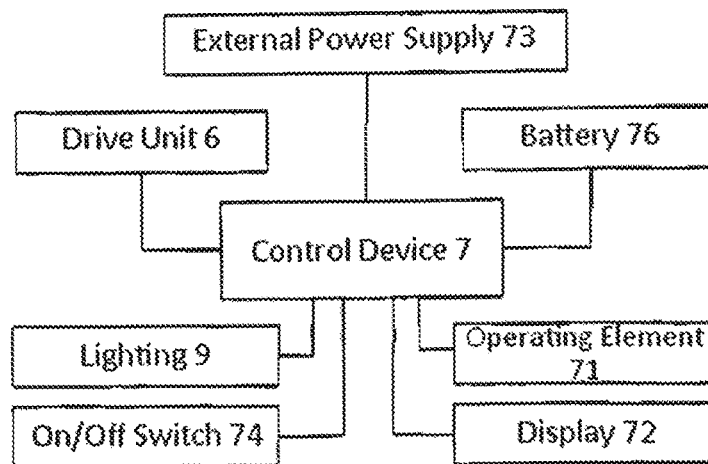


Fig. 14a

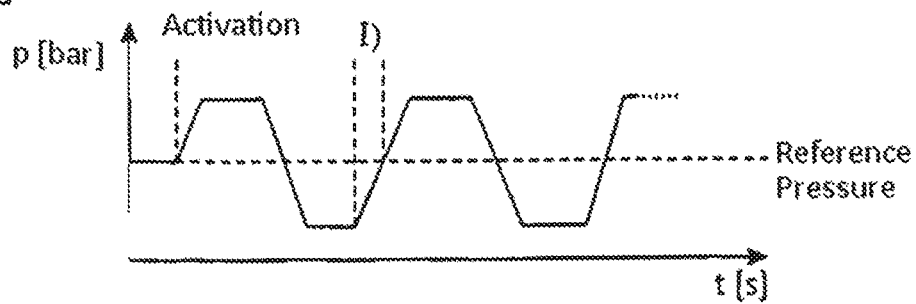


Fig. 14b

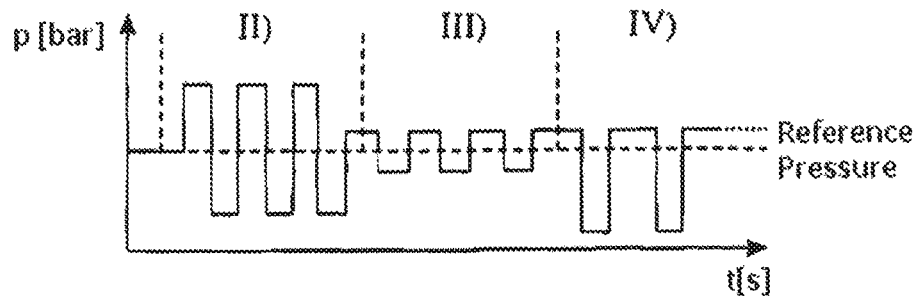
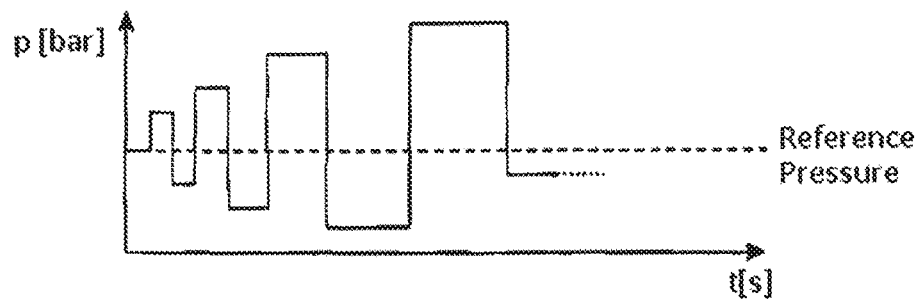


Fig. 14c



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STIMULATION DEVICE**CROSS-REFERENCE TO RELATED APPLICATIONS**

This patent is a Continuation of U.S. patent application Ser. No. 15/354,599, filed Nov. 17, 2016, now U.S. Pat. No. 10,857,063, which is a Continuation of U.S. patent application Ser. No. 15/023,471, filed Mar. 21, 2016, now U.S. Pat. No. 9,763,851, which is a national stage (under 35 U.S.C. 371) of International Patent Application No. PCT/EP2014/065734, filed Jul. 22, 2014, which claims priority to German Patent Application No. 102013110501.7, filed Sep. 23, 2013, the disclosures of which are herein incorporated by reference in their entirety.

TECHNICAL FIELD

Embodiments of the present invention relate to a stimulation device for erogenous zones, in particular for the clitoris, a system with a stimulation device, and methods for stimulating body parts.

BACKGROUND

The erogenous zones of the human body can be stimulated with a variety of tools. For example, vibrators are used to apply a stimulus to a particular area of the skin by direct contact. However, this form of stimulation can lead to irritations or inflammations of the skin. Also, direct contact of the genital area with such tools for individual reasons of hygiene or due to personal reservations, for example, may not be desired.

In particular, the direct stimulation of the clitoris with a clitoral massage vibrator, for example, is fraught with problems, as the clitoris is usually a woman's most sensitive erogenous zone. The entire clitoris is equipped with numerous nerve endings, thus making it particularly touch-sensitive and responsive to sexual stimuli. Here, the clitoris glans, in which the nerve cords of the two thighs meet, should be particularly emphasized. Frequent use of a clitoral massage vibrator for direct stimulation, for example, leads to habituation effects or conditioning of the stimulated erogenous zone and the initial use of such a device may require certain practice or familiarization.

Furthermore, medical studies conducted in 2006 determined the female clitoris as definitive starting point of the female climax and neurologically proved the different qualities of sensation of clitoral (and vaginal) orgasm for the first time. Thus, according to the most recent medical research, the stimulation of the clitoris, rather than the vagina, is considered the starting point of a woman's sexual arousal and thereby the key to female "sexual pleasure".

The sensitivity of the human erogenous zones, such as the clitoris, the inner and outer labia or the nipples, continues to differ greatly individually. The person may be so sensitive that direct stimulation is only possible after prolonged foreplay, and even then only very subtly or ruled out completely. Furthermore, the sensitivity of the corresponding zone can change dramatically from one situation to another or even during a sexual act.

For the aforementioned reasons, various indirect forms of stimulation are common practice as alternatives to direct stimulation.

For indirect stimulation of erogenous zones, and especially the clitoris, conventional vacuum devices are used to arouse the erogenous zones of the person concerned without

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directly contacting the main area to be stimulated. Thus, for example, vacuum pumps for the primary or secondary female sexual organs are known, which usually have a suction cup for placing on the appropriate area and a hand pump. The negative-pressure exerted by this type of device on the clitoris, for example, generates a negative pressure in the clitoris itself, which is usually lower than the systolic blood pressure. This difference in pressure leads to an enlargement of the clitoris and/or stimulates the blood flow in the affected area. This vascular clitoral engorgement serves both to promote desire by increasing sensitivity and for optical and tactile manipulation. The improved blood circulation also leads to an increased leakage of vaginal moisture which makes the stimulation more pleasurable. However, the manual operation of the hand pump is often annoying or distracting. In addition, the long-term or uninterrupted use of negative-pressure in this device category may lead to habituation effects, which limit the effectiveness of the device in the long run. Moreover, a pure increase in the clitoral blood flow is often insufficient to reach a climax; vacuum pumps are thus often used only as foreplay to achieve the climax with a subsequent direct (pressure) massage of the erogenous zone.

Electrically driven vacuum pumps are also used increasingly instead of manually operated vacuum pumps as well. As an example of this, WO 2006/05 82 91 A2 discloses a device for sexual therapy, wherein the arrangement consists of a tubular suction chamber for the clitoris, an electric vacuum source (vacuum pump) and a plurality of airflow openings. The operation of the vacuum pump generates a permanent airflow or air exchange in the chamber in the area of the clitoris. This has the disadvantageous effect of suctioning the increasingly leaking vaginal moisture caused by the negative-pressure, thus having a drying effect on the stimulated parts of skin. Likewise, the suctioned moist air leads to a contamination of the fluidic subsequent vacuum arrangement, of the vacuum pump for example. Such arrangements with vacuum pumps may thus be hygienically problematic, as vacuum pumps and the associated valves or ventilation components often have dead spaces or blind spots and/or are difficult to clean. Furthermore, the device is meant to treat the blood vessels in the clitoris and not to provide stimulation up to sexual climax.

U.S. Pat. No. 6,099,463 A discloses a clitoris stimulation device with a tubular suction chamber, a vacuum source or a vacuum pump and a plurality of valves, which are used to control the size of the vacuum. The vacuum can also be in cyclic form to achieve a stimulation effect, although habituation effects are also to be expected with this device due to the use of a permanent vacuum. As explained above, the disadvantages relating to hygiene and the dehydration of the skin part to be stimulated are also present here. Likewise, the pressure-related arrangement with a plurality of valves, vacuum pump, etc. is relatively complex.

U.S. Pat. No. 6,464,653 B1 discloses therapeutic devices and methods to generate a clitoral engorgement with the aid of a vacuum generated by a vacuum pump to assist in the treatment of clitoral disorders, such as incontinence. A control valve or modulator that can be correspondingly covered by a finger is used to manually adjust or vary the amount of vacuum in the suction chamber. This requires the user's attention and may be distracting or diverting under certain circumstances. This relatively complex device with additional valves also has the same disadvantages relating to hygiene and dehydration as explained above, although the device is also used for long-term therapeutic purposes and not for short-term sexual stimulation.

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WO 2008/028076A2 discloses a therapeutic device for women, which is mainly dedicated to treating sexual disorders. The device includes a combination of indirect stimulation by means of a vacuum chamber and direct stimulation by means of mechanical vibrators and oscillators.

The negative-pressure in this therapeutic device is used to increase the blood flow in the clitoris, while the area of skin is actually stimulated or massaged by means of direct mechanical vibrations/oscillations. Thus, a suction cup for placing on the area of skin to be stimulated is internally connected with a motor via a mechanical connection. The suction cup is extended by the motor once the device is activated, thus increasing the volume of the suction cup. The resulting volume of the suction cup and thus the strength of the vacuum can be adjusted by means of control elements on the device. The air displaced in the device by the suction process is discharged outwardly again via a pipe. The vacuum in this device has only a supporting function, while the actual stimulation ensues directly, which also entails the same disadvantages of a direct stimulation as explained above.

US 2013/001276 9A1 discloses a device in which a pulsating positive-pressure is used for stimulating an air pressure massage. A pump or compressor thus generates a pulsating positive-pressure, which is directed towards the erogenous zone to be stimulated by means of a nozzle. This device disadvantageously causes the affected area of skin to dry out severely or completely. Likewise, there is usually a temperature difference between the temperature of the supplied air and the temperature of the area of skin to be stimulated, which may be felt to be distracting under certain circumstances. The same problems of hygiene as explained above also occur in this device, although in this case any pathogens or germs or other contaminations located in the device are also transported directly to the user's genital area.

Thus, the prior art devices all have the same disadvantage in common, in that the complexity of the arrangements generating negative-pressure or positive-pressure may be high and this device may have problems of hygiene.

Furthermore, the prior art devices have another disadvantage in common, in that habituation effects occur in the event of constant or frequently recurring use of negative-pressures.

Another disadvantage of some of the previously described vacuum devices is, firstly, that the negative-pressure has to be limited by means of a control valve or a vacuum pump and, secondly, that the negative-pressure is supposed to be reduced by means of a manual opening of a release valve, before the suction cup is peeled from the skin. Should one of the valves have a technical defect and/or the user operate the device incorrectly, there may be a risk of injury in certain circumstances.

Thus, in view of the problems as explained above, the problem addressed by the embodiments discussed herein is to provide a stimulation device with a simple construction that is easy and safe to use.

Another problem addressed by the embodiments discussed herein is to provide a stimulation device with an effective stimulation-triggering effect, which is suitable for stimulating an erogenous zone, especially the female clitoris.

In addition, partial problems addressed by the embodiments discussed herein are to provide a device, which prevents the erogenous zones to be stimulated from drying out, is hygienic and prevents habituation effects.

The above problems are addressed by embodiments of the stimulation device described herein. Advantageous devel-

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opments and embodiments are the subject-matter of other alternative independent claims and dependent claims.

SUMMARY

A stimulation device is provided in accordance with one embodiment. The stimulation device includes a chamber which has a flexible wall portion. In one embodiment, the flexible wall portion may include silicon and may be integral with the chamber. A drive unit of the stimulation device is in physical communication with the flexible wall portion so as to cause deflections of the flexible wall portion in opposing directions, thereby resulting in a changing volume of the chamber. The changing volume of the chamber results in modulated positive and negative pressures with respect to a reference pressure. The modulated positive and negative pressures are applied to a body part (e.g., a clitoris) through an opening of the stimulation device. For example, the opening of the stimulation device may be placed over the body part to apply the modulated positive and negative pressures. The drive unit is controlled by a control device of the stimulation device.

In one embodiment, the stimulation device includes a second chamber. The changing volume of the chamber results in the modulated positive and negative pressures in the second chamber.

In one embodiment, the stimulation device may be a portable hand-held device with a battery. The stimulation device may also have an operating element for adjusting the modulated positive and negative pressures and a light emitting diode for indicating a status of the stimulation device.

In accordance with an embodiment, the stimulation device includes a pressure field generator which has a flexible wall portion. A drive unit of the stimulation device is in physical communication with the flexible wall portion so as to cause deflections of the flexible wall portion in opposing directions, thereby resulting in a changing volume of the pressure field generator. The changing volume of the pressure field generator results in modulated positive and negative pressures with respect to a reference pressure. The modulated positive and negative pressures are applied to a body part through an opening of the stimulation device. The drive unit is controlled by a control device of the stimulation device.

In one embodiment, the pressure field generator includes a first chamber and a second chamber. As such, deflections in the flexible wall portion of the first chamber of the pressure field generator result in the modulated positive and negative pressures in the second chamber of the pressure field generator.

The above-described features and functions of embodiments of the present invention as well as other aspects and features are further described in the following with the aid of a detailed description of preferred embodiments with reference to the enclosed illustrations.

BRIEF DESCRIPTION OF DRAWINGS

The figures show in:

FIG. 1 a front view of a first embodiment of the stimulation device according to the invention;

FIG. 2 a perspective side view of the first embodiment of the stimulation device according to the invention;

FIG. 3 a cross-section through section A-A of the first embodiment of the stimulation device shown in FIG. 1 according to the invention;

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FIG. 4 a cross-section through section A-A of a pressure field generator of the stimulation device shown in FIG. 1 according to a first aspect of the present invention in the first state;

FIG. 5 a cross-section through section A-A of a pressure field generator of the stimulation device shown in FIG. 1 according to a first aspect of the present invention in the second state;

FIG. 6 a cross-section through section A-A of a pressure field generator of the stimulation device shown in FIG. 1 according to a first aspect of the present invention in the third state;

FIG. 7 a cross-section through section A-A of a pressure field generator of the stimulation device shown in FIG. 1 according to a second aspect of the present invention;

FIG. 8 a cross-section through section A-A of a pressure field generator of the stimulation device shown in FIG. 1 according to a third aspect of the present invention;

FIG. 9 a cross-section through section A-A of a pressure field generator of the stimulation device shown in FIG. 1 according to a fourth aspect of the present invention;

FIGS. 10 a), b) and c) cross-sections through section A-A of a pressure field generator of the stimulation device shown in FIG. 1 according to a fifth aspect of the present invention;

FIG. 11 a partial cross-section through section A-A of a second embodiment of the stimulation device shown in FIG. 1 according to the invention;

FIGS. 12 a) to f) various bottom and side views of other aspects of a second chamber of the present invention;

FIG. 13 a block diagram of an embodiment of the present invention; and

FIGS. 14 a) to c) diagrams of various pressure modulation patterns of the present invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

According to one embodiment, a pressure field generator in the stimulation device has at least one first chamber and at least one second chamber with at least one opening for placing on a body part or on the erogenous zone and at least one connection element that connects the first chamber with the second chamber.

This embodiment of chambers communicating in a fluidic manner via at least one connection element allows the first chamber to simply generate a pressure field in the second chamber by modifying the volume in the first chamber, which is occasionally directed at the area of skin to be stimulated.

A pressure field is a temporally modifiable field of media pressures, with occasional positive-pressure and occasional negative-pressure, a negative-pressure being a media pressure below the reference pressure and a positive-pressure being a media pressure above the reference pressure.

The medium is usually gaseous, preferably air, but may alternatively or additively, for example, be a liquid medium, such as water or commercially available lubricant. For example, the chambers may be filled with the lubricant prior to using the stimulation device. This allows the corresponding area of skin to be stimulated with a suitable skin-friendly liquid in lieu of air as well, whatever the user's individual preference. As another example, the stimulation device may also be used under water with water as the medium (in the bathtub, for example).

The reference pressure is usually the existing ambient pressure in relation to the stimulation device at the beginning of use (i.e. prior to placing the stimulation device on the

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area of skin to be stimulated). In the preferred use of the stimulation device with air, the reference pressure is the currently existing air pressure or normal pressure.

The pressure field excites the blood circulation of the area of skin to be stimulated, while said area of skin is indirectly massaged, thus combining two advantageous effects. The increased blood circulation makes the erogenous zone of the person concerned more sensitive, while generating an additional massage effect that serves, for example, to stimulate the erogenous zone to sexual arousal up to climax. The massage effect is generated by the kinetic energy of the medium flowing out of the first chamber through the connection element against the surface of the area of skin to be stimulated. The massage effect generated in this way is indirect, i.e. without the area of skin to be stimulated being contacted by a solid body, such as a vibrator, which results in the avoidance of the initially explained disadvantages of direct stimulation.

By the exemplary use of the temporally modifiable pressure field on the clitoris, the pressure field imitates a stimulation that usually only occurs during sexual intercourse. Likewise, the cohabitation movement generates a varying stimulus on the clitoris. It is thus a true-to-life imitation of the natural act of cohabitation, with medical statements confirming that the use of the pressure field causes neither habituation effects nor addiction. This is due in particular to the alternating use of negative- and positive-pressures (or even to the non-continuous use of only one type of pressure).

Furthermore, the maximum applicable pressure is regularly limited by the maximum resilience of the area of skin to be stimulated. Thus, for instance, too high a negative-pressure harbors the risk of painful injury, especially in erogenous zones. Only stimulation devices working with negative-pressures are usually limited to this maximum in their mode of operation. Conversely, the combination of positive- and negative-pressures creates an extended working area of the stimulation-triggering pressure field or effect, as the working area of the pressure can now be exploited to the maximum in both the positive and negative area.

The orientation of the at least one connection element towards the area of skin to be stimulated allows the pressure field to work directly, wherein the pressure field is decisively influenced by the configuration of the at least one connection element and of the at least one opening from the connection element into the second chamber, and is thus adjustable after every use of the stimulation device. Thus, for example, the at least one opening of the connection element may be located opposite and preferably directly opposite the body part to be stimulated. For example, the connection element in a stimulation device intended for the clitoris may have a single passageway with nozzle effect on the clitoris glans between the first and second chamber. Alternatively, the at least one connection element may consist of a plurality, for example four, of passageways between the chambers, if a larger area of skin is to be stimulated.

Furthermore, after placing the halfway or partially opened second chamber on the area of skin to be stimulated, a self-contained system of media- and airflow is created in the pressure field generator. Thus, for instance, the medium or air is moved decisively backwards and forwards between the chambers, while an interchange with media or with air from outside the system being at least largely avoidable. Thus, the first chamber is preferably connected exclusively with the second chamber via or through the connection element. Thus, no first chamber connections other than those to the second chamber exist; for example, there is no direct first

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chamber connection to the environment of the device via a pressure valve or via an air discharge channel.

For example, the air temperature in the flow system rapidly adjusts to the skin temperature, while the distracting supply of new (possibly cold) air from outside the system is avoided, as may be the case, *inter alia*, when using vacuum pumps in prior art. Drying effects are also avoided, as very little or no removal of stimulation-promoting fluid, such as bodily fluid, occurs in a closed system.

Furthermore, due to the simple construction, the pressure field generator has the advantage of increased hygiene and improved cleanability. The pressure field generator thus avoids valves or pumps/compressors with potential dead spaces and places that cannot be cleaned. The pressure field generator is thus easy to clean. For example, the stimulation device can be simply cleaned by filling the first chamber with a cleaning agent and activating the pressure field. Alternatively, the second chamber can be arranged to be replaceable, which also simplifies the cleaning of both chambers. Furthermore, the chambers and the connection element of the pressure field generator can be designed in one-piece, wherein the latter consists of a single molded plastic part (e.g. rubber).

In addition, the construction avoids complex fluidic elements, such as valves, which leads to a simplification in production.

Furthermore, the stimulation device has a drive unit, which modifies the volume in the first chamber in such a way that a pressure field is generated via the connection element in the second chamber that serves to stimulate the erogenous zone, and has a control device that activates the drive unit.

As a matter of principle, the medium transported between the chambers is limited to the maximum volume of the first chamber. In addition, the transported volume can be further constructively limited by the maximum possible volume modification caused by the drive unit.

This means that the maximum positive- or negative-pressure the stimulation device can build up in the second chamber is limited due to the dimensioning of the components of the pressure field generator and of the drive. In particular, the maximum positive- or negative-pressure can be limited to degree that minimizes or excludes any risk of injury for the areas of skin to be stimulated. As a result, any conventional safety valve in prior art or any manual intervention in the stimulation process by the user, such as the opening of a release valve, is rendered unnecessary.

Furthermore, the temporal modification of the pressure field or the modification of the pressure field by the control device is automatically controlled to a large extent. Thus, for example, the modulation of the pressure field, such as intensity, chronological sequence or evolution, can be pre-saved in the control device. As a preference, the temporal modification of the pressure field can have a regular or reoccurring (stimulation) pattern, such as impulses with a stipulated cycle or regularly alternating impulse sequences. This allows the user's interaction with the stimulation device to be limited to switching on and off and selecting the stimulation pattern, while the stimulation device automatically executes the preferred stimulation pattern. Thus, the user complexity of the stimulation device is low, especially when compared with conventional (medical) vacuum stimulation devices. Alternatively, or additionally, the stimulation pattern of the stimulation device can be individually configured by the user during or before operation.

In one embodiment, a system includes the stimulation device and a remote control device. The remote control

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device is arranged separately from the stimulation device, wherein the control device of the stimulation device is remotely controlled by the remote control device. This allows a conventional wireless (via radio for example) or wired remote control to be employed, in order to allow the remote controlled moderation of the stimulation device or the activation thereof by another user.

In one embodiment, a method for stimulating body parts, especially the clitoris, is disclosed. The associated advantages effects and impacts are explained in more detail above in relation to the pressure field.

In one embodiment, the stimulation device is used as a sex toy for stimulating the female clitoris. As explained at the beginning, the female clitoris is an especially erogenous zone of women, which is why the use of an indirect massage combined with a negative-pressure-stimulation for this body part to provide stimulation up to orgasm seems particularly advantageous.

With reference to FIG. 1, a front view of a first embodiment of stimulation device 1 is explained, wherein FIG. 2 shows a perspective view and FIG. 3 a cross-section of the first embodiment of stimulation device 1 according to one or more embodiments.

The first embodiment of stimulation device 1 is a preferably electric or small device, comprising a housing 8, a pressure field generator 2, operating elements 71, a display 72, an on/off switch 74, a socket 75, an optional battery 76 and optional lighting 9.

Housing 8 is preferably designed so ergonomically that it can be held comfortably in one hand and has no sharp or pointed edges. Furthermore, housing 8 may consist of plastic, such as polycarbonate (PC) or acrylonitrile butadiene styrene (ABS). In addition, the gripping areas or even the entire housing may be supplemented by or designed in a haptically advantageous silicone. Housing 8 is preferably designed to be at least water-resistant or splash-proof, for example protection class IP 24.

Operating elements 71 are used to adjust the device operating mode, i.e. to adjust the pressure field modulation pattern. Operating elements 71 can, for example, be designed as at least one pushbutton, as at least one rotary switch, or as at least one touch-sensitive switch. Furthermore, operating elements 71 can produce an optical feedback for activating light emitting diodes (LED) integrated in the center of the switch, for example.

An optional display 72 serves to inform the user of the device status and/or the setting status. Display 72 can for example be configured as a plurality of light diodes or as an LCD display. The displayed information can, for example, be the charge status of an optional battery or the current setting of the modulation pattern.

On/off switch 74 is used for activating and deactivating stimulation device 1. This on/off switch 74 can, for example, be a pushbutton, which switches stimulation device 1 on or off when held down, or a ratcheting slide switch.

A socket 75 is used to supply the external power of stimulation device 1 via an external plug 73, which is connected to an external power adapter, for example. To ensure stimulation device 1 is splash-proof, a magnetic-inductive transformer may be provided instead of the socket, which allows power to be transmitted to stimulation device 1 without any electroconductive contact. Stimulation device 1 preferably also has a battery, such as a nickel metal hydride battery (NiMH) for wireless operation. Alternatively, a (longer) power supply cable may also be led out of the stimulation device.

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Pressure field generator 2 of a first embodiment has a first chamber 3 in the interior of stimulation device 1, a second chamber 4 for placing on a body part 11 to be stimulated, and a connection element 5, which connects the first chamber 3 with the second chamber 4.

A drive unit 6, such as an electric motor, drives the first chamber 3 via an axis 61 and by means of an eccentric 62 (or alternatively by means of a connecting rod) in such a way that the volume of the first chamber 3 is modified according to the rotation of axis 61 of drive unit 6. It is hereby annotated that any drive types causing a deflection in wall 31 of the first chamber 3 for volume modification can basically be used in stimulation device 1. The latter may, for example, occur hydraulically, pneumatically, piezoelectrically, mechanically or electromagnetically. Examples of this are described in more detail later on.

A control device 7 activates drive unit 6, operating elements 71 and display 72. Control device 7 and drive unit 6 are supplied with power by internal battery 76 and/or external power supply 73.

Optional lighting 9 is provided on or in housing 8. Lighting 9 is preferably used for lighting the interior of the second chamber 4. Lighting 9 can either be switched by the user or automatically activated by activating stimulation device 1. Furthermore, lighting 9 can be composed of energy-saving light diodes. The lighting can, for example, serve as an orientation aid in the dark for the user of stimulation device 1 or as additional optical stimulation.

With reference to FIGS. 4, 5 and 6, the construction and function of a first aspect of pressure field generator 2 of stimulation device 1 is subsequently described in more detail.

FIG. 4 shows pressure field generator 2 in a first state, with the second chamber 4 being placed on the area of skin or body part 11 to be stimulated. The first state of pressure field generator 2 is characterized by a neutral deflection of the first chamber 3, i.e. no external force is exerted on the first chamber 3, for example, by the drive unit. Here, volume V1 of the first chamber is the standard volume of this chamber 3.

The body part 11 to be stimulated is an area of skin on the body, wherein for example an especially sensitive erogenous zone, clitoris 12, is shown. The use of the stimulation device 1 is thus not limited to the female clitoris 11, instead stimulation device 1 can be used on all body parts or erogenous zones (such as the inside of the upper thighs, the loins, neck, nipples, etc.), which can be stimulated by means of media- or air-pressure massage and/or negative-pressure.

Due to being placed on the body part 11 to be stimulated, the second chamber 4 forms a chamber largely or completely sealed off from the exterior of pressure field generator 2, which is only still connected to the second chamber via connection element 5, wherein the edges of chamber 4 ideally form an air-tight bond with the surface of body part 11. Two communicating chambers 3 and 4 are created in this way, wherein corresponding pressure equalization via connection element 5 ensues between chambers 3 and 4 in the event of a volume modification in one of chambers 3 or 4.

Wall 31 of the first chamber 3 is secured by means of a holder 32. Holder 32 is in turn attached to housing 8. Wall 41 of the second chamber is further affixed to holder 32. Two mutually aligned openings in wall 41 of the second chamber and of holder 32 jointly form connection element 5, which connects the first chamber 3 and the second chamber 4. Wall 31, holder 32 and wall 41 are preferably adhered to each other media- or air-tightly. Alternatively, the latter can also be press-fitted or screwed together with each other (for

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example by means of sealing areas between housing 8 and the respective part). Holder 32 can also be adhered or screwed onto housing 8, for example.

Wall 31 of the first chamber 3 preferably consists of a flexible media- or airtight material, such as rubber. Holder 32 preferably consists of a rigid plastic, which is just as media- and airtight. Wall 41 of the second chamber is preferably made of a flexible, skin-friendly material, such as silicone or rubber.

FIG. 5 shows pressure field generator 2 of FIG. 4 in a second state, wherein the second chamber 4 is in turn placed on the body part 11 to be stimulated. The second state is characterized in that a force A affecting the first chamber 3 causes chamber 3 to expand. In detail, force A in this embodiment draws wall 31 of the first chamber 3 in a direction facing away from the second chamber 4.

Volume V2 in chamber 3 increases as a result, i.e., $V2 > V1$. To equalize the difference in pressure created between chambers 3 and 4, the media or air now flows from the second chamber 4 into the first chamber 3.

Assuming that the first state of the present pressure in chambers 3 and 4 corresponds to the currently prevailing external reference pressure (air pressure for example); the present overall pressure in the second state will now be less than the external reference pressure. This negative-pressure is designed in such a way that it is preferably less than the usual systolic blood pressure in the blood vessels of body part 11. The blood circulation in this area thus increases and clitoris 12 is better supplied with blood in the second state.

FIG. 6 shows pressure field generator 2 in a third state, wherein the second chamber 4 is in turn placed on the body part 11 to be stimulated. The third state is characterized in that a force B influencing the first chamber 3 causes a volume reduction or compression in chamber 3. In detail, the direction of force B is opposed to the direction of force A and distorts wall 31 of the first chamber in such a way that the resulting volume V3 of the chamber is less than volume V1. The compression of chamber 3 causes a positive-pressure in chamber 3, which is equalized by a media- or airflow through connection element 5 in the direction of the second chamber 4.

This media flow is now preferably directed by the orientation of opening 51 and/or of connection element 5 towards the body part 11 to be stimulated, in particular towards the glans of clitoris 12. The indirect (pressure) massage ensues due to the medium flowing onto body part 11. The size of opening 51 is dimensioned in such a way that it is small enough in ratio to the volume displaced in the first chamber 3 to sufficiently accelerate the medium for a perceptible massage effect.

Furthermore, the type of flow can not only be advantageously influenced by the size and orientation of opening 51, but also by the inner configuration of the connection element. For example, helix-shaped grooves in connection element 5 can cause the flow to swirl, wherein the flow profile of the flow unfurls a "softer" or more turbulent effect on the body part to be stimulated. Alternatively, the resulting pressure field in the second chamber 4 can be adjusted by means of a plurality of openings 51, depending on use.

The advantageous factor of the arrangement shown in FIGS. 4 to 6 is that it is hygienically unproblematic (due to the avoidance of dead spaces, for example) and is simple to produce. For example, no valves or other openings in or on the first chamber 3 are required.

FIG. 7 shows one embodiment of an alternative construction of pressure field generator 2. Walls 31 and 41 of the first and second chambers 3 and 4 respectively can thus engage

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with one another in such a way that they also form two communicating chambers with a connection element 5, as in the first aspect of the construction of pressure field generator 2. Thus, the separate holder is no longer required, while the second chamber 4 is replaceable. In addition, connection element 5 can be designed integrally or in one-piece with wall 41 of the second chamber 4. A replaceable chamber 4 has the advantage of allowing the use of any shapes of chamber 4 adjusted to the respective body part (a more detailed description thereof is provided later), without the entire stimulation device 1 needing to be replaced. Alternatively, the second chamber 4 can also be pluggably affixed to housing 8 (not shown in more detail). Wall 31 of the first chamber 3 can be adhered or screwed onto housing 8, for example.

Also, as shown in more detail in FIG. 7 by the broken line and double arrow C, the first chamber 3 is expanded and compressed by a force exerted perpendicularly to the axial direction of connection element 5. In principle, the force exerted directly or indirectly on the first chamber 3 by drive unit 6 can be exerted from any direction. The only decisive criterion here is that the volume of the first chamber 3 can be increased and decreased by drive unit 6.

FIG. 8 shows one embodiment of an integral or one-piece structure of pressure field generator 2. An elastic material, such as silicone or rubber, can be used as material for chambers 3 and 4. The advantage here is that any hygienically unsafe divide is avoided and the production effort is reduced. Pressure field generator 2 can be adhered or screwed onto housing 8 in this case too. Any modification of the volume in the first chamber 3 is analogous here, as described in conjunction with FIG. 7.

FIG. 9 shows one embodiment of an alternative construction of pressure field generator 2. The second chamber 4, a plurality of connection elements 5, as well as partial sections of wall 31 of the first chamber 3 are designed in one-piece. Alternatively, pressure field generator 2 can be constructed in two or more pieces from individual components, while safeguarding the geometrical example of FIG. 9 in a similar way to that shown in FIG. 4 or 7.

The volume in chamber 3 is modified in a similar way to a piston pump, although no valves are available here. A piston 63 is thus moved backwards and forwards by the drive unit, for example an electric motor or electromagnet, in the directions of the double arrow D. This type of drive has the advantage that the volume of the first chamber 3 can be simply reduced to zero or almost zero, thus allowing the first chamber 3 to be almost completely emptied.

The embodiment of connection element 5, with a plurality of channels 52 and openings 51, leads to a distribution of the pressure field to a plurality of concentration points. While the embodiment of connection element 5 with only one channel, as described in conjunction with FIG. 6, leads to the formation of a strongly concentrated media- or airflow on a target area, the embodiment of connection element 5 shown in FIG. 9 allows the media- or airflow to be distributed to a plurality of target areas, thus allowing clitoris 11 to be blown not just on its glans, but equally from a plurality of directions as well, for example. Depending on use, this distribution of the airflow concentration to a plurality of areas can help to avoid any overstimulation and/or help to increase the stimulation area.

FIGS. 10a to 10c show (partial) cross-sections of one embodiment of a construction of pressure field generator 2 with a bending element 64 as drive for modifying the volume in the first chamber 3. Bending element 64 can, for example, be a conventional piezoelectric bending element,

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which distorts or bends once voltage is applied. In this embodiment wall 31 of the first chamber 3 is a rigid or stiff construction, while bending element 64 is suitably dovetailed to the sides of the first chamber 3. The transition points between bending element 64 and wall 31 are sealed (elastically bonded for example). The drive for pressure field generator 2 is already integrated in this construction and an external drive is not required. An electric motor with an eccentric is not needed, for example. This allows, inter alia, the reduction of any disturbing natural oscillations due to the eccentric movement of the stimulation device.

In detail, FIG. 10a shows pressure field generator 2 with bending element 64 in a neutral position. Thus, the volume of the first chamber 3 with bending element 64 in the neutral position is the standard volume. FIG. 10b also shows the first chamber 3 with an excited and, consequently, outwardly bent bending element, while the volume of the first chamber 3 is increased, with a negative-pressure consequently prevailing in pressure field generator 2. FIG. 10c shows a bending element of the first chamber 3 excited in the opposite direction to FIG. 10b, which is why the volume in the first chamber 3 has decreased, with a positive-pressure consequently prevailing in pressure field generator 2.

FIG. 11 shows one embodiment with a locally separated arrangement of chambers 3 and 4 of pressure field generator 2. Chambers 3 and 4 are connected via an extended connection element 5, which can be a longer flexible hose or even a rigid pipe. For example, connection element 5 may be 0.5 m in length. This enables housing 8 to be held in one hand, while the other hand holds the second chamber 4 on the body part 11 to be stimulated; or one can simply lay housing 8 aside, while the user holds only the second chamber 4 in his/her hands. The stimulation device in this embodiment can also be designed as a table device.

FIGS. 12 a) to 12 f) show various bottom and side views of other aspects of the second chamber 4 in accordance with one or more embodiments. In detail, FIG. 12 a) shows a bottom view of a circular second chamber 4 with a centrally arranged opening 51; FIG. 12 b) a bottom view of a triangular second chamber 4 with a centrally arranged opening 51; FIG. 12 c) a bottom view of an oval second chamber 4 with a centrally arranged opening 51; and FIG. 12 d) a bottom view of an almost eight-shaped second chamber 4 with two openings 51 shifted to the center. FIG. 12 e) further shows a side cross-section of a second chamber 4, wherein the second chamber 4 has an additional extended contact surface 43 to the skin or a support part 43 to improve the sealing function of the second chamber 4 on the skin. The extended contact surface 43 may also have grooves or projections that improve the sealing function even more. FIG. 12 f) shows a side cross-section of a second chamber 4 with a plurality of separate connection elements 5 and an extended contact surface due to support part 43.

In principle, the form of the second chamber 4 can thus be adjusted to the anatomy of the erogenous zone to be stimulated. The form of chamber 4 in FIG. 12 a) is, for example, adjusted to the round shape of the breast, while the form of chamber 4 in FIG. 12 c) is better suited to the form of the female vulva. Furthermore, the shape of the second chamber 4 also determines the characteristic of the pressure field. The size of the second chamber 4 in ratio the volume displaced from chamber 3 thus determines the amount of the achievable negative- or positive-pressure. Furthermore, the proximity of opening 51 of connection element 5 to the area of skin to be stimulated can also be used to determine the intensity of the massage effect on said area of skin. A plurality of openings 51, cf. FIG. 12 d) allows the massage

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effect to be distributed to a plurality of areas. Thus, for example, the clitoris can be less directly stimulated at the very sensitive clitoris glans (cf. FIG. 12 *e*), and more stimulated at the areas surrounding the clitoris glans, in order to prevent overstimulation of the clitoris.

FIG. 13 shows a block diagram of an example of the functional construction of an embodiment with a control device 7, a drive unit 6, lighting 9, an on/off switch 74, operating elements 71, a battery 76 and an external power supply 73.

Control device 7, which has a microcontroller or is hardwired, for example, initially controls the power supply of all users of stimulation device 1, as well as an optional charging and discharging process of battery 76 and/or a battery management. In particular, control device 7 controls the excitation of drive unit 6, such as the size of the deflection, the frequency, the modulation, etc.

Furthermore, control device 7 may have a memory in which at least one modulation or stimulation pattern (described in more detail in conjunction with FIG. 14 *a*) is saved. The excitation of drive unit 6 can now be activated via operating elements 71 in compliance with the previously saved stimulation pattern at the discretion of the user of stimulation device 1. The stimulation pattern of the pressure field can also be optionally and individually adjusted and saved by the user via the operating elements.

FIG. 14 *a*) shows the chronological sequence of a total pressure *p* in the pressure field generator (2) when using the latter for stimulation. The broken line provides the reference pressure, such as the currently prevailing atmospheric pressure that exists outside the pressure field generator (2). If the second chamber 4 is now placed on body part 11 to be stimulated, the originally prevailing ambient pressure in the pressure field generator (2) is maintained, for example. It is now assumed that the second chamber 4 is sealed tightly to the body part to be stimulated for the most part. Once the stimulation device is activated, drive unit 6 is activated or excited by control device 7 according to a previously saved stimulation pattern. Accordingly, the volume of the first chamber 3 and thus the total pressure in pressure field generator 2 are modified, with the pressure modifications being modified to the reference pressure. The pressure or stimulation pattern shown as an example in FIG. 14 *a*) develops a pulsed, regular pressure field. In phases of pressure increase, the erogenous zone to be stimulated is blown on or massaged, while in the times when a negative-pressure prevails, the blood circulation of body part 11, the clitoris for example, is promoted. Thus, time periods exist (designated in FIG. 14 *a*) as I)) in which a negative-pressure prevails, while the clitoris is simultaneously indirectly massaged.

FIG. 14 *b*) shows three examples of alternative stimulation patterns. Thus, the area designated as II) shows a pulsed stimulation pattern with high amplitude. The area designated as III) shows a pulsed stimulation pattern with low amplitude. Furthermore, the area designated as IV) illustrates an irregular and asymmetrical stimulation pattern as regards chronological sequence and amplitude. The patterns can be varied according to individual bodily effect/use and according to individual wishes.

FIG. 14 *c*) shows another example of an alternative stimulation pattern. The strength of pressure may, for example, increase with time, in order to adjust to the user's state of excitement.

In addition to the explained embodiments, other basic design principles are allowed. For example, different arrangements or constructions of the first chamber 3 may be

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arbitrarily combined with various embodiments of the second chamber 4 or connection element 5. For example, the first chamber 3 with the drive in FIG. 10 can be combined with the second chamber in FIG. 12 *f*).

Although only one first chamber 3 is shown in all embodiments, two or more first chambers 3 may be present, which are then appropriately activated simultaneously or time-delayed in such a way that their volume is modified in order to build up a pressure field.

Although only one opening from the first chamber 3 to connection element 5 is shown in all embodiments, a plurality of openings for a connection element 5 or even more openings for a plurality of connection elements 5 may be present in the first chamber 3.

A stimulation device 1 can have a plurality of pressure field generator 2. Thus, for example, two pressure field generators may be available to stimulate two erogenous zones simultaneously.

The stimulation patterns can deviate from the patterns shown in FIGS. 14 *a*), *b*) and *c*), as long as they have a chronological sequence of over- and negative-pressures. For example, a relatively long-lasting negative-pressure can initially be built up at the beginning or after activation of the device (3 minutes for example), in order to effectively increase the blood circulation of the zone to be stimulated, whereupon pulsed negative- and over-pressures of a slowly increasing amplitude then follow.

LIST OF REFERENCE NUMERALS

- 1 Stimulation device
- 2 Pressure field generator
- 3 First chamber
- 4 Second chamber
- 5 Connection element
- 6 Drive unit
- 7 Control device
- 8 Housing
- 9 Lighting
- 11 Body part
- 12 Clitoris
- 31 Wall of first chamber
- 32 Holder
- 41 Wall of second chamber
- 42 Opening of second chamber
- 43 Contact surface
- 51 Opening of connection element to second chamber
- 61 Drive shaft
- 62 Eccentric
- 63 Piston
- 64 Bending element
- 71 Operating element
- 72 Display
- 73 Power supply
- 74 On/off switch
- 75 Socket
- 76 Battery
- 77 Control board

The invention claimed is:

1. A stimulation device comprising:
 - a chamber having a flexible wall;
 - a drive unit in physical communication with the flexible wall to cause at least a portion of the flexible wall to deflect in opposing directions, thereby resulting in a changing volume of the chamber, the changing volume of the chamber resulting in modulated positive and negative pressures with respect to an ambient pressure;

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an opening configured to sealingly engage a portion of a body of a user including a clitoris, the modulated positive and negative pressures to be applied to the portion of the body via the opening, the opening being a sole opening of the chamber to an exterior of the stimulation device, the flexible wall to sealingly separate the drive unit from the portion of the body;

a control device configured to receive input from the user and control the drive unit to create the modulated positive and negative pressures; and

a housing enclosing the drive unit and the control device.

2. The stimulation device of claim 1, wherein the modulated positive and negative pressures are to affect a flow of blood to the clitoris.

3. The stimulation device of claim 1, wherein the opening is configured to be placed over a clitoris glans.

4. The stimulation device of claim 1, wherein the flexible wall is integral with the chamber.

5. The stimulation device of claim 1, wherein the flexible wall includes silicone.

6. The stimulation device of claim 1, wherein the stimulation device is a portable hand-held device including a battery.

7. The stimulation device of claim 1, wherein the housing includes a water resistant material.

8. The stimulation device of claim 7, wherein the water resistant material includes acrylonitrile butadiene styrene (ABS).

9. The stimulation device of claim 1, further including an operating element in communication with the drive unit to cause the drive unit to adjust the creation of the modulated positive and negative pressures.

10. The stimulation device of claim 1, wherein the opening extends through a flexible material.

11. The stimulation device of claim 10, wherein the flexible material includes silicone.

12. The stimulation device of claim 10, wherein at least a portion of the flexible material protrudes from the housing.

13. The stimulation device of claim 10, wherein the flexible wall and the flexible material form one piece.

14. The stimulation device of claim 10, wherein the flexible wall includes a first material and the flexible material includes a second material different from the first material.

15. The stimulation device of claim 1, wherein the opening has a first width defined by an edge of the opening that is to contact the portion of the body, and a portion of the housing including the flexible wall has a second width, the second width greater than the first width.

16. The stimulation device of claim 1, wherein the drive unit is to selectively cause the flexible wall to deflect based on a first stimulation pattern or a second stimulation pattern.

17. A stimulation device comprising:

a pressure field generator including a flexible wall;

a drive unit in physical communication with the flexible wall to cause at least a portion of the flexible wall to deflect in opposing directions, thereby resulting in a changing volume of the pressure field generator, the

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changing volume of the pressure field generator resulting in modulated positive and negative pressures with respect to an ambient pressure;

an opening configured to sealingly engage a portion of a body of a user including a clitoris, the modulated positive and negative pressures to be applied to the portion of the body via the opening, the opening being a sole opening of the pressure field generator to an exterior of the stimulation device, the flexible wall to sealingly separate the drive unit from the portion of the body;

a control device configured to receive input from the user and control the drive unit to create the modulated positive and negative pressures; and

a housing enclosing the drive unit and the control device.

18. The stimulation device of claim 17, wherein the modulated positive and negative pressures are to affect a flow of blood to the clitoris.

19. The stimulation device of claim 17, wherein the opening is configured to be placed over a clitoris glans.

20. The stimulation device of claim 17, wherein the flexible wall is integral with the pressure field generator.

21. The stimulation device of claim 17, wherein the flexible wall includes silicone.

22. The stimulation device of claim 17, wherein the stimulation device is a portable hand-held device including a battery.

23. The stimulation device of claim 17, wherein the housing includes a water resistant material.

24. The stimulation device of claim 23, wherein the water resistant material includes acrylonitrile butadiene styrene (ABS).

25. The stimulation device of claim 17, further including an operating element in communication with the drive unit to cause the drive unit to adjust the creation of the modulated positive and negative pressures.

26. The stimulation device of claim 17, wherein at least a portion of the pressure field generator protrudes from the housing.

27. The stimulation device of claim 26, wherein the portion of the pressure field generator protruding from the housing includes a flexible material.

28. The stimulation device of claim 27, wherein the flexibility of the material of the portion of the pressure field generator protruding from the housing is greater than a flexibility of a material of the housing.

29. The stimulation device of claim 26, wherein the flexible wall and the portion of the pressure field generator protruding from the housing form an integral surface.

30. The stimulation device of claim 26, wherein the flexible wall includes a first material and the at least the portion of the pressure field generator protruding from the housing includes a second material different than the first material.

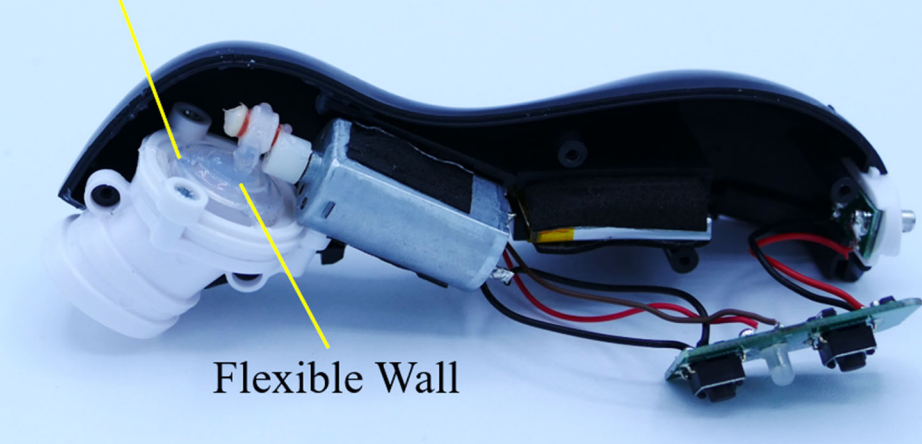
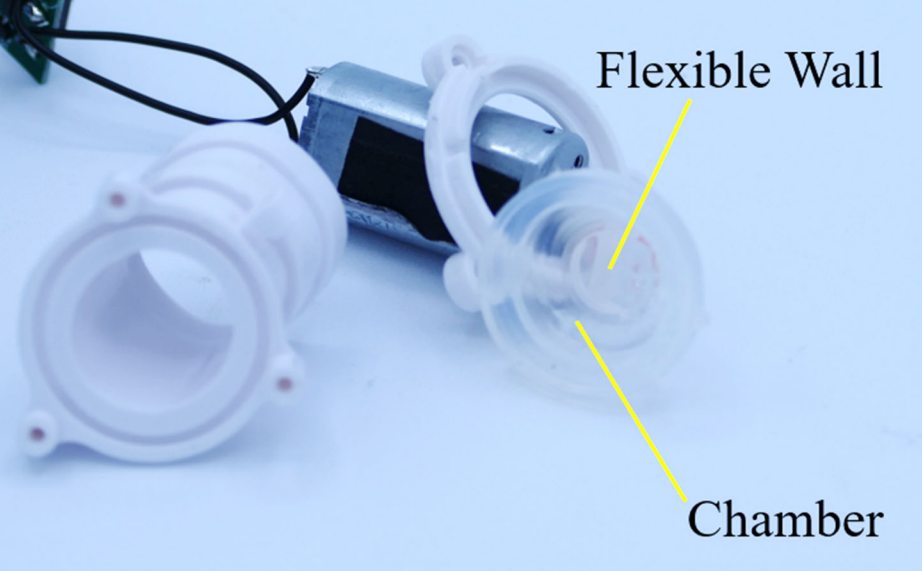
31. The stimulation device of claim 17, wherein at least a portion of the flexible wall is supported by the housing.

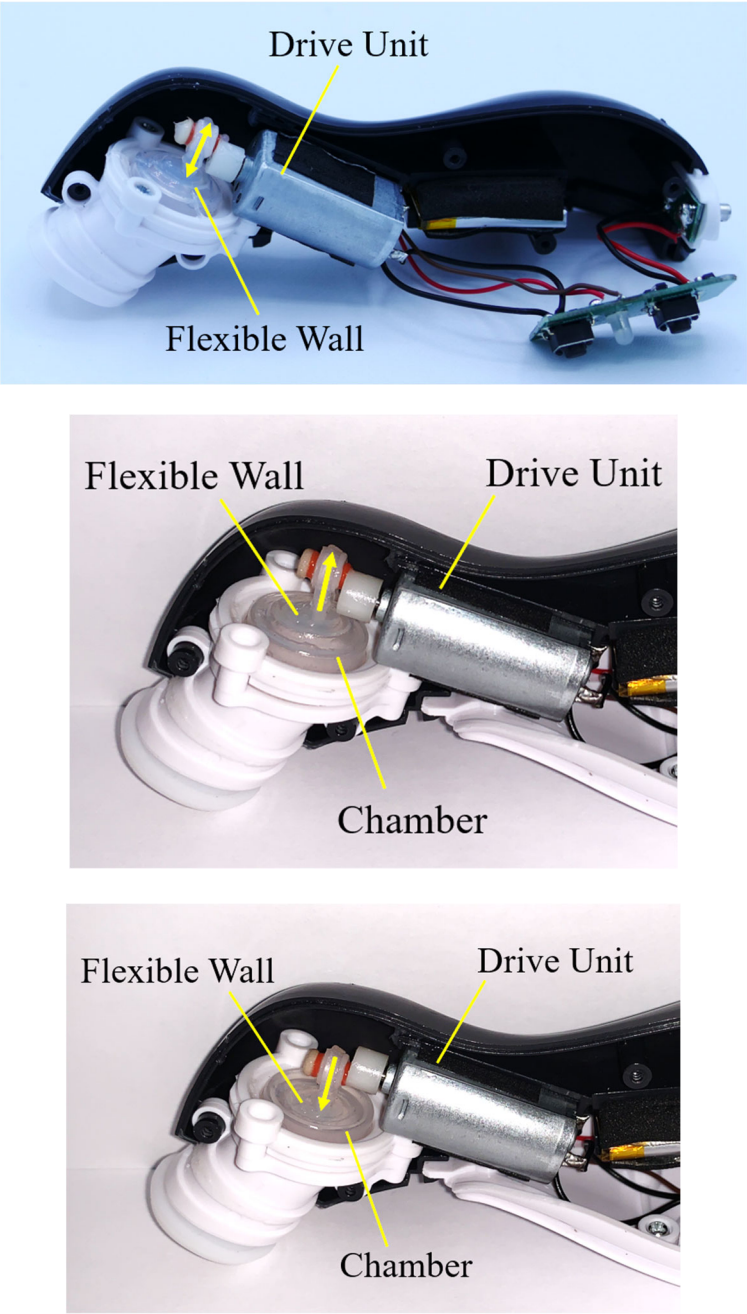
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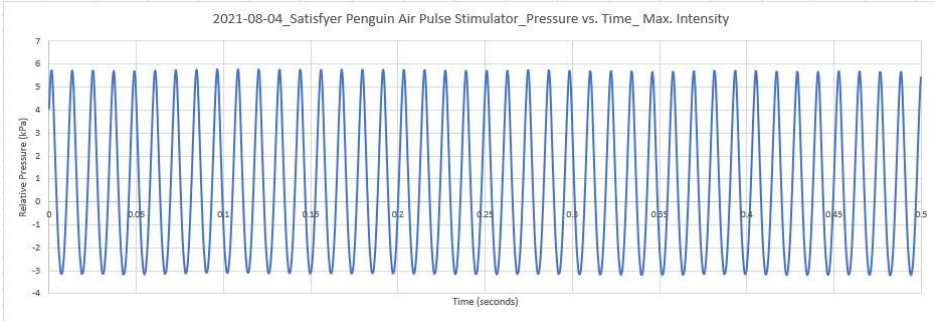
Exhibit 8

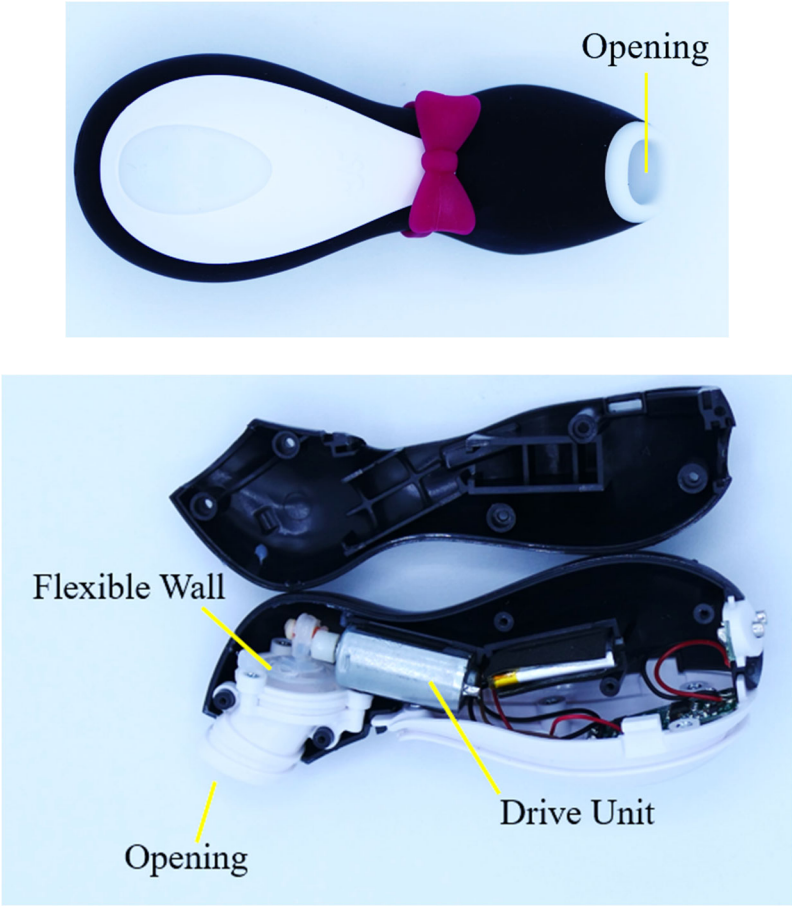
**REPRESENTATIVE CLAIM CHART 4:
SATISFYER PENGUIN AIR PULSE STIMULATOR AND
CLAIM 1 OF U.S. PATENT NO. 11,090,220 (“’220 PATENT”)**

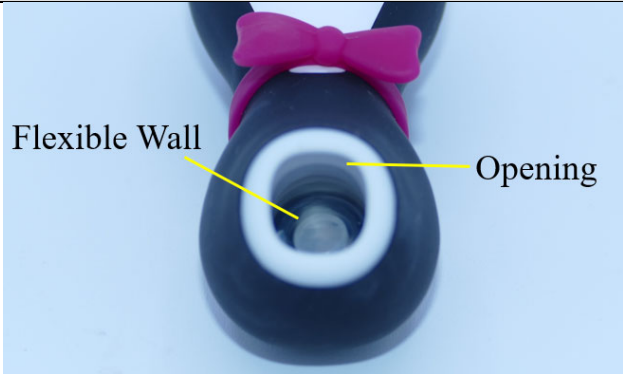

Claim Language of the ’220 Patent	Satisfyer Penguin Air Pulse Stimulator
1. A stimulation device comprising:	<p>The Satisfyer Penguin Air Pulse Stimulator is a stimulation device:</p>   <p>The packaging of the Satisfyer Penguin Air Pulse Stimulator shows the device is a stimulation device for a clitoris:</p> <p style="text-align: center;"><i>“Pressure wave and touch-free clitoral stimulation”</i></p> 

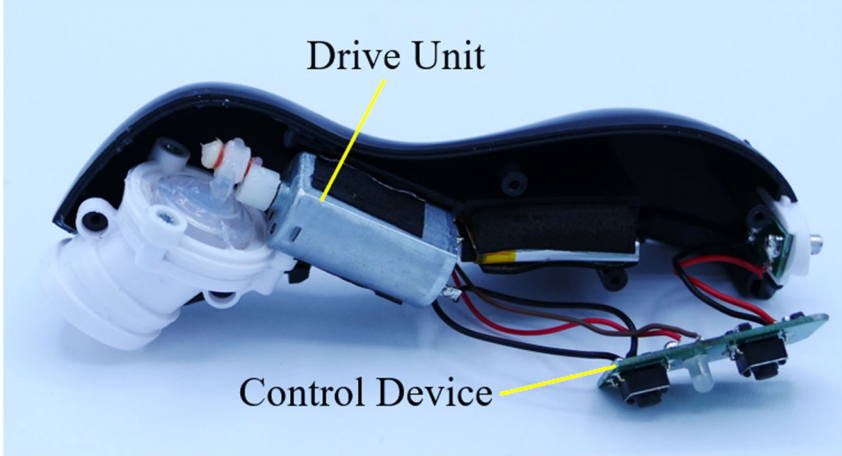
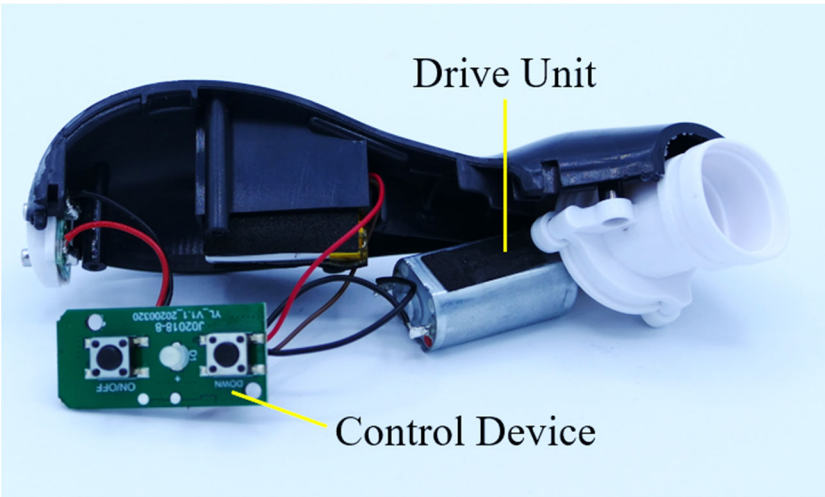
Claim Language of the '220 Patent	Satisfyer Penguin Air Pulse Stimulator
a chamber having a flexible wall;	<p>The Satisfyer Penguin Air Pulse Stimulator has a chamber having a flexible wall.</p> <p>The following annotated photographs of a disassembled Satisfyer Penguin Air Pulse Stimulator show a chamber with its flexible wall:</p> <div><p>Chamber</p><p>Flexible Wall</p><p>This photograph shows the internal components of the Satisfyer Penguin Air Pulse Stimulator. A yellow line points from the label 'Chamber' to a white, cylindrical plastic component. Another yellow line points from the label 'Flexible Wall' to a clear, flexible, circular wall within the chamber. The device is shown in a disassembled state, with the black outer casing removed, revealing the motor, battery, and wiring.</p></div> <div><p>Flexible Wall</p><p>Chamber</p><p>This photograph provides a closer view of the disassembled components. A yellow line points from the label 'Flexible Wall' to the clear, flexible wall. Another yellow line points from the label 'Chamber' to the white, cylindrical plastic component. The components are shown in a disassembled state, with the black outer casing removed, revealing the motor, battery, and wiring.</p></div>

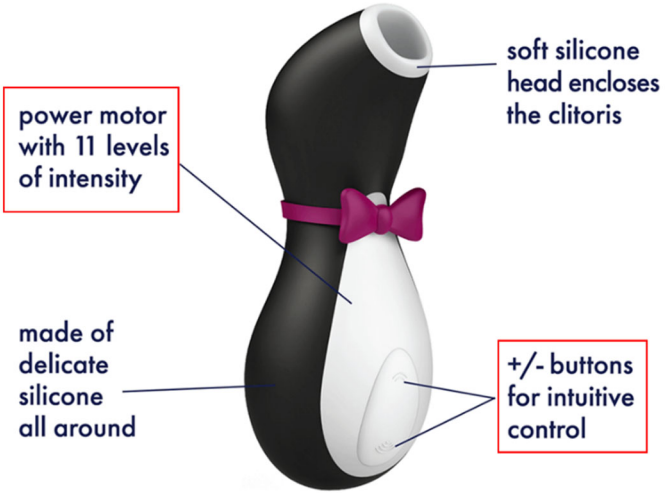
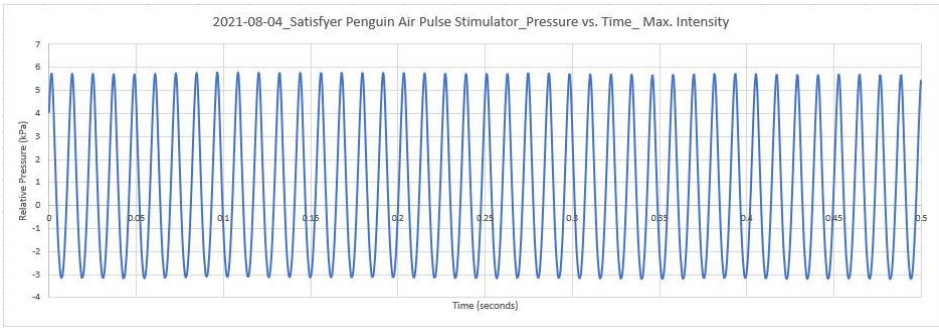
Claim Language of the '220 Patent	Satisfyer Penguin Air Pulse Stimulator
<p>a drive unit in physical communication with the flexible wall to cause at least a portion of the flexible wall to deflect in opposing directions, thereby resulting in a changing volume of the chamber, the changing volume of the chamber resulting in modulated positive and negative pressures with respect to an ambient pressure;</p>	<p>The drive unit of the Satisfyer Penguin Air Pulse Stimulator is in physical communication with the flexible wall to cause at least a portion of the flexible wall to deflect in opposing directions, thereby resulting in a changing volume of the chamber, the changing volume of the chamber resulting in modulated positive and negative pressures with respect to an ambient pressure, as shown in the following annotated photographs:</p>  <p>The first photograph shows the drive unit and flexible wall in a neutral state. The second photograph shows the flexible wall deflected upwards, increasing the volume of the chamber. The third photograph shows the flexible wall deflected downwards, decreasing the volume of the chamber.</p>

Claim Language of the '220 Patent	Satisfyer Penguin Air Pulse Stimulator
	<p>The graph below shows the modulated positive and negative pressures with respect to ambient pressure resulting from the changing volume of the chamber. In the graph, 0 kPa represents the ambient pressure.</p> <p>The graph shows the resulting modulated positive pressures (pressure measurements greater than 0 kPa) and negative pressures (pressure measurements less than 0 kPa) with respect to ambient pressure measured by a differential pressure sensor, <i>i.e.</i>, a pressure sensor measuring pressure changes against the prevailing ambient pressure (not measurement of absolute pressure by an absolute pressure sensor).</p> 

Claim Language of the '220 Patent	Satisfyer Penguin Air Pulse Stimulator
<p>an opening configured to sealingly engage a portion of a body of a user including a clitoris, the modulated positive and negative pressures to be applied to the portion of the body via the opening, the opening being a sole opening of the chamber to an exterior of the stimulation device, the flexible wall to sealingly separate the drive unit from the portion of the body;</p>	<p>The Satisfyer Penguin Air Pulse Stimulator includes an opening configured to sealingly engage a portion of a body of a user including a clitoris, the modulated positive and negative pressures to be applied to the portion of the body via the opening, the opening being a sole opening of the chamber to an exterior of the stimulation device, the flexible wall to sealingly separate the drive unit from the portion of the body.</p> <p>The following annotated photographs of a Satisfyer Penguin Air Pulse Stimulator and its Quick Start Guide show an opening configured to sealingly engage a portion of a body of a user including a clitoris, that the opening is the sole opening of the chamber to an exterior of the stimulation device, that the flexible wall sealingly separates the drive unit from the portion of the body, and that the modulated positive and negative pressures are applied to the portion of the body via the opening:</p> 

Claim Language of the '220 Patent	Satisfyer Penguin Air Pulse Stimulator
	<div><p>Flexible Wall</p><p>Opening</p></div> <div><p>Use • Benutzung • Utilisation • Uso • Utilização • Utilizzo • Використання • Использование • 使用 • 使用</p><p>+Lube</p></div>

Claim Language of the '220 Patent	Satisfyer Penguin Air Pulse Stimulator
a control device configured to receive input from the user and control the drive unit to create the modulated positive and negative pressures; and	<p>The Satisfyer Penguin Air Pulse Stimulator has a control device configured to receive input from the user and control the drive unit to create the modulated positive and negative pressures, as shown in the following annotated photographs:</p> <div><p>Drive Unit</p><p>Control Device</p><p>This photograph shows the internal components of the Satisfyer Penguin Air Pulse Stimulator. A yellow line points from the label 'Drive Unit' to a small, rectangular, light-colored component. Another yellow line points from the label 'Control Device' to a green printed circuit board (PCB) with various electronic components.</p></div> <div><p>Drive Unit</p><p>Control Device</p><p>This photograph shows the Satisfyer Penguin Air Pulse Stimulator from a different angle. A yellow line points from the label 'Drive Unit' to the same small, rectangular, light-colored component. Another yellow line points from the label 'Control Device' to the same green printed circuit board (PCB) with various electronic components.</p></div>

Claim Language of the '220 Patent	Satisfyer Penguin Air Pulse Stimulator
	<p>Further, as described on Satisfyer's website (available at https://us.satisfyer.com/us/products/air-pulse-technology/air-pulse-stimulators/penguin/), the product has external buttons that interact with the control device such that the control device is configured to receive input from the user and control the drive unit to create the modulated positive and negative pressures:</p> <p style="text-align: center;">PRODUCT FEATURES</p>  <p>The diagram shows a black and white silicone device shaped like a penguin. Callouts indicate: 'power motor with 11 levels of intensity' (pointing to the black upper body), 'soft silicone head encloses the clitoris' (pointing to the white opening at the top), 'made of delicate silicone all around' (pointing to the white lower body), and '+/- buttons for intuitive control' (pointing to two buttons on the lower body).</p> <p>The graph below is further evidence that the control device controls the drive unit to create the modulated positive and negative pressures. As noted above, positive pressures are pressure measurements greater than 0 kPa and negative pressures are pressure measurements less than 0 kPa with respect to ambient pressure (represented by 0 kPa) measured by a differential pressure sensor.</p>  <p>The graph, titled '2021-08-04_Satisfyer Penguin Air Pulse Stimulator_Pressure vs. Time_Max. Intensity', shows a continuous, high-frequency oscillating waveform. The y-axis is 'Relative Pressure (kPa)' ranging from -4 to 7, and the x-axis is 'Time (seconds)' ranging from 0 to 0.5. The waveform oscillates between approximately 5.5 kPa and -3.5 kPa.</p>

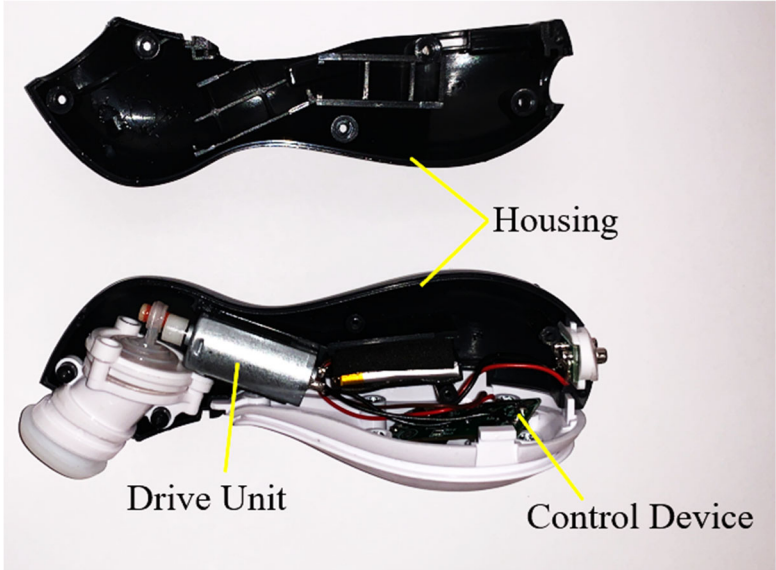
Claim Language of the '220 Patent	Satisfyer Penguin Air Pulse Stimulator
a housing enclosing the drive unit and the control device.	<p>The Satisfyer Penguin Air Pulse Stimulator has a housing enclosing the drive unit and the control device, as shown in the following annotated copy of a photograph of the disassembled device:</p> 

Exhibit 9



US011103418B2

(12) **United States Patent**
Lenke

(10) **Patent No.:** **US 11,103,418 B2**

(45) **Date of Patent:** ***Aug. 31, 2021**

(54) **STIMULATION DEVICE**

(56) **References Cited**

(71) Applicant: **NOVOLUTO GmbH**, Berlin (DE)

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(72) Inventor: **Michael Lenke**, Metten (DE)

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(Continued)

(73) Assignee: **NOVOLUTO GMBH**, Berlin (DE)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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This patent is subject to a terminal disclaimer.

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(22) Filed: **Apr. 27, 2018**

(Continued)

(65) **Prior Publication Data**

US 2018/0243162 A1 Aug. 30, 2018

Related U.S. Application Data

(63) Continuation of application No. 15/354,599, filed on Nov. 17, 2016, which is a continuation of application (Continued)

Primary Examiner — Michael J Tsai

(74) *Attorney, Agent, or Firm* — Hanley, Flight & Zimmerman, LLC

(30) **Foreign Application Priority Data**

Sep. 23, 2013 (DE) 102013110501.7

(51) **Int. Cl.**

A61H 19/00 (2006.01)

A61H 9/00 (2006.01)

(52) **U.S. Cl.**

CPC **A61H 19/34** (2013.01); **A61H 9/00** (2013.01); **A61H 9/005** (2013.01); **A61H 9/0007** (2013.01);

(Continued)

(58) **Field of Classification Search**

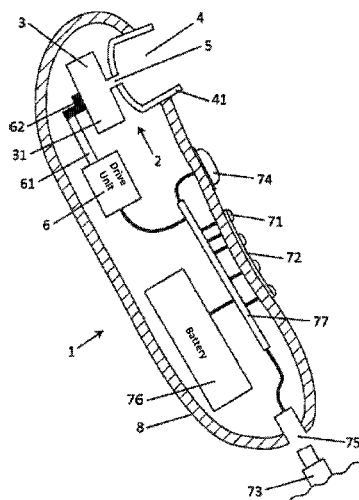
CPC .. A61H 9/00; A61H 9/005; A61H 2009/0064; A61H 19/00; A61H 19/30;

(Continued)

(57) **ABSTRACT**

A stimulation device is provided in accordance with one embodiment. The stimulation device includes a chamber which has a flexible wall portion. A drive unit of the stimulation device is in physical communication with the flexible wall portion so as to cause deflections of the flexible wall portion in opposing directions, thereby resulting in a changing volume of the chamber. The changing volume of the chamber results in modulated positive and negative pressures with respect to a reference pressure. An opening of the stimulation device is for applying the modulated positive and negative pressures to a body part. The stimulation device includes a control device for controlling the drive unit.

35 Claims, 7 Drawing Sheets



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Related U.S. Application Data

No. 15/023,471, filed as application No. PCT/EP2014/065734 on Jul. 22, 2014, now Pat. No. 9,763,851.

(52) U.S. Cl.

CPC *A61H 9/0057* (2013.01); *A61H 19/00* (2013.01); *A61H 19/30* (2013.01); *A61H 2201/0153* (2013.01); *A61H 2201/0157* (2013.01); *A61H 2201/1207* (2013.01); *A61H 2201/1215* (2013.01); *A61H 2201/1238* (2013.01); *A61H 2201/1409* (2013.01)

(58) Field of Classification Search

CPC *A61H 19/34*; *A61H 19/50*; *A61H 23/02*; *A61H 23/0254*; *A61H 2205/087*
See application file for complete search history.

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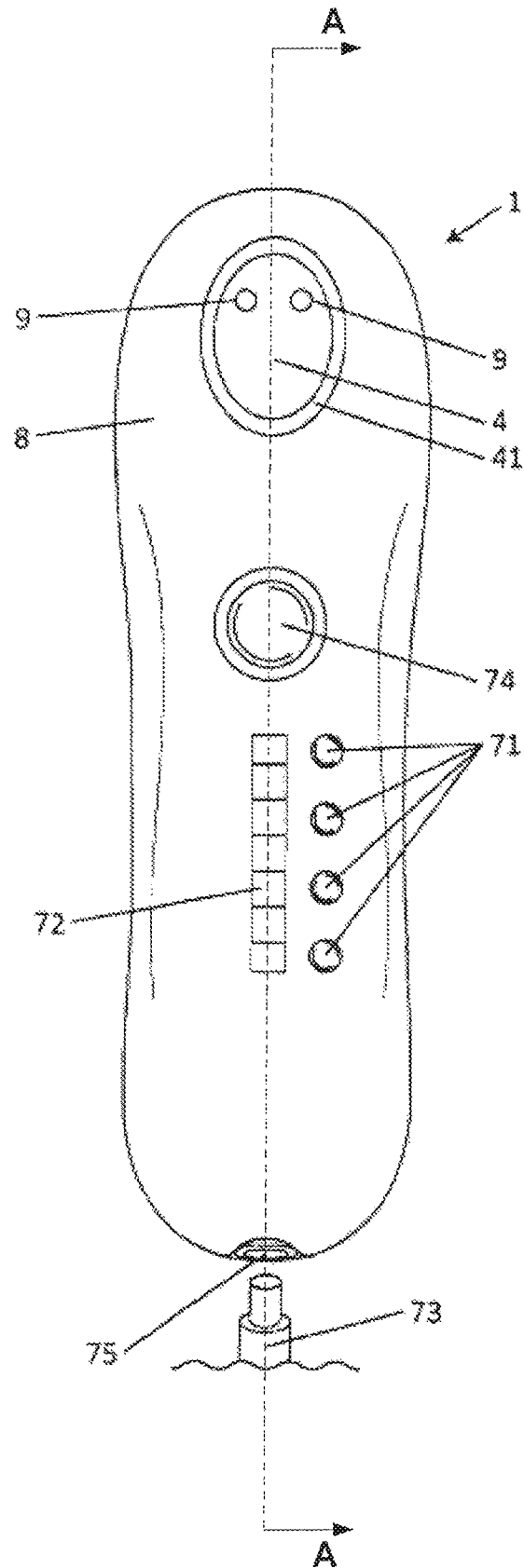
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Fig. 1



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Fig. 2

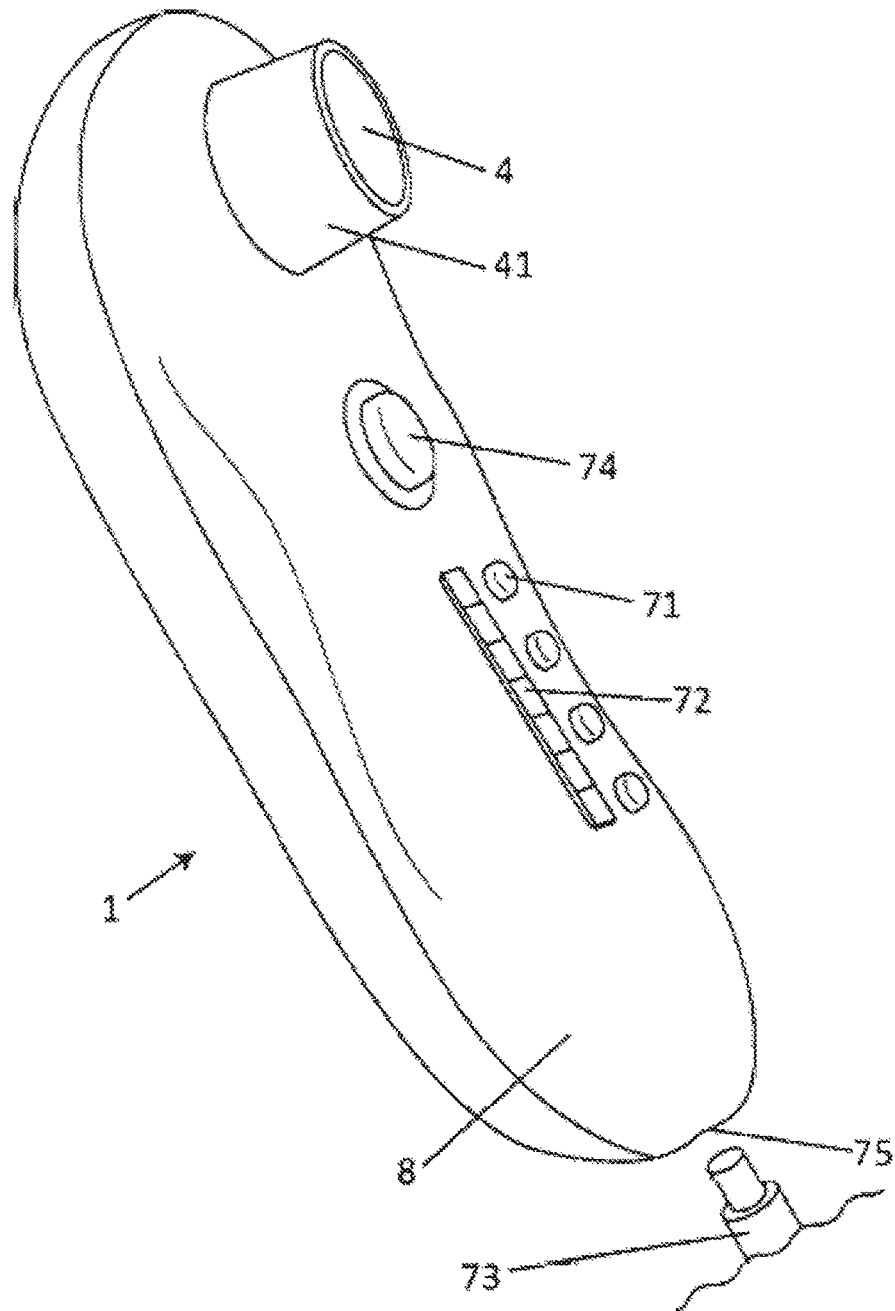


Fig. 3

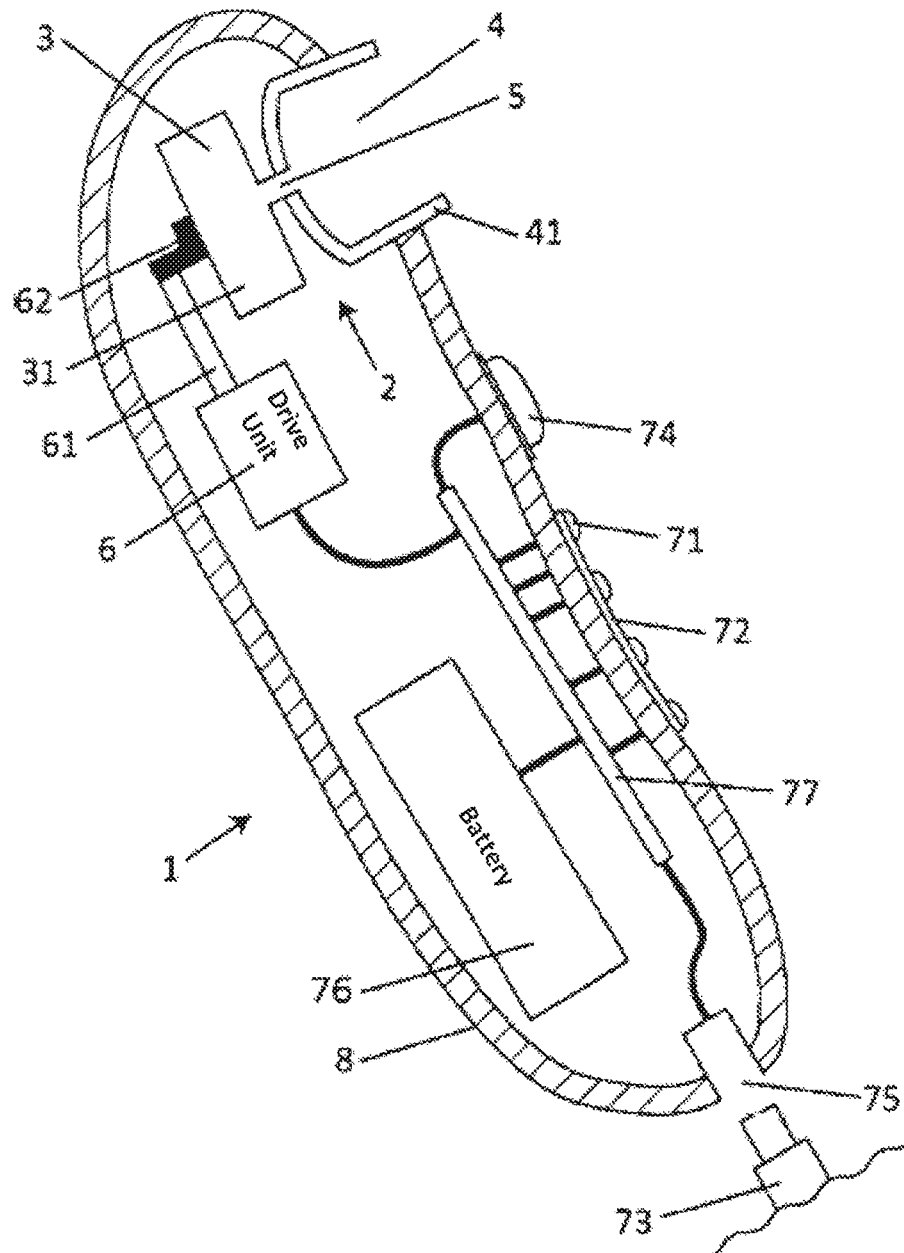


Fig. 4

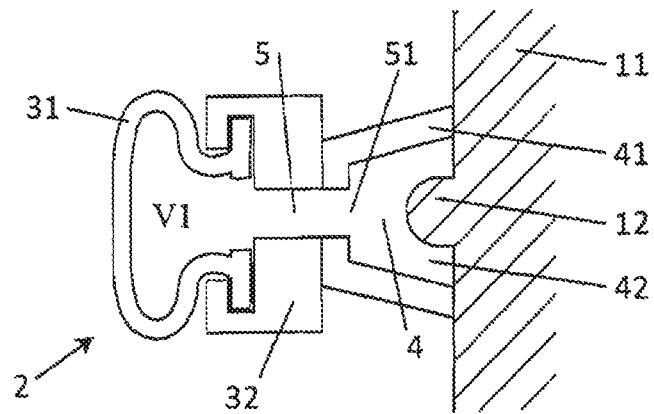


Fig. 5

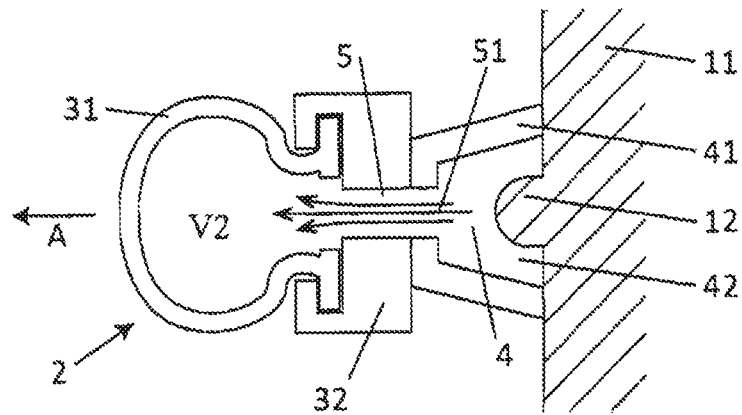


Fig. 6

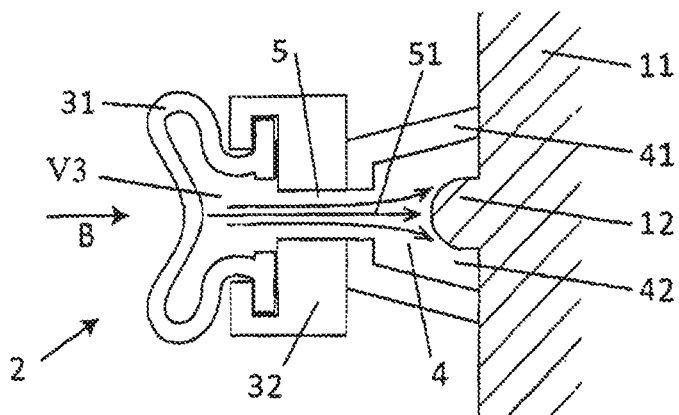


Fig. 7

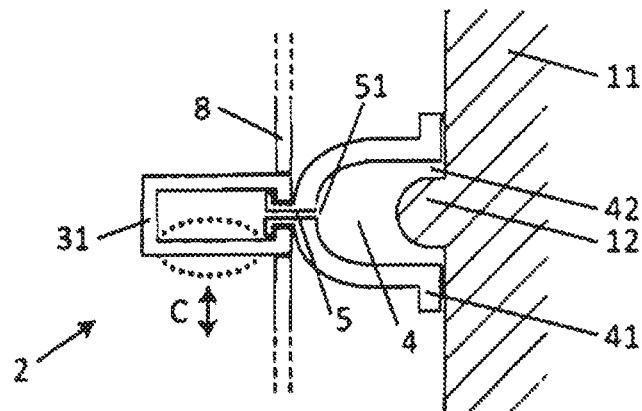


Fig. 8

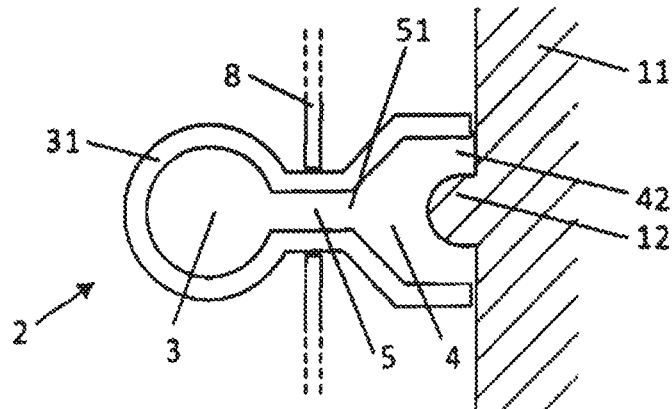


Fig. 9

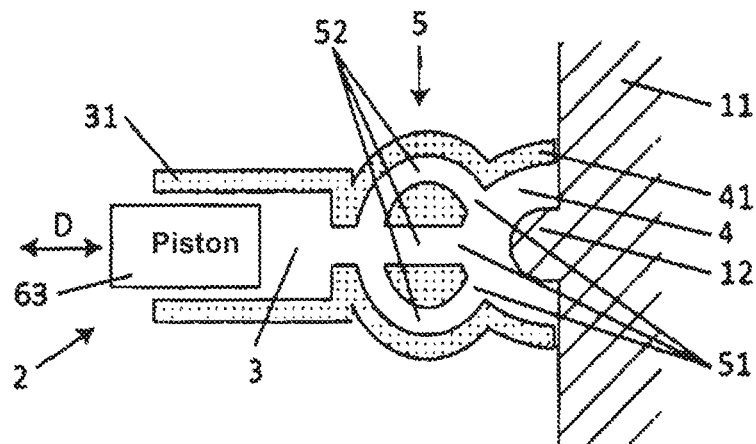


Fig. 10a

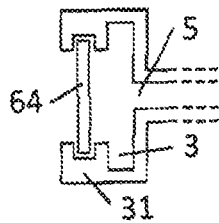


Fig. 10b

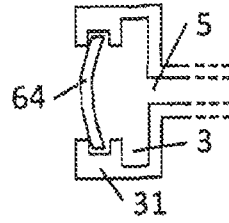


Fig. 10c

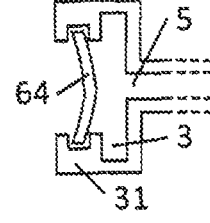


Fig. 11

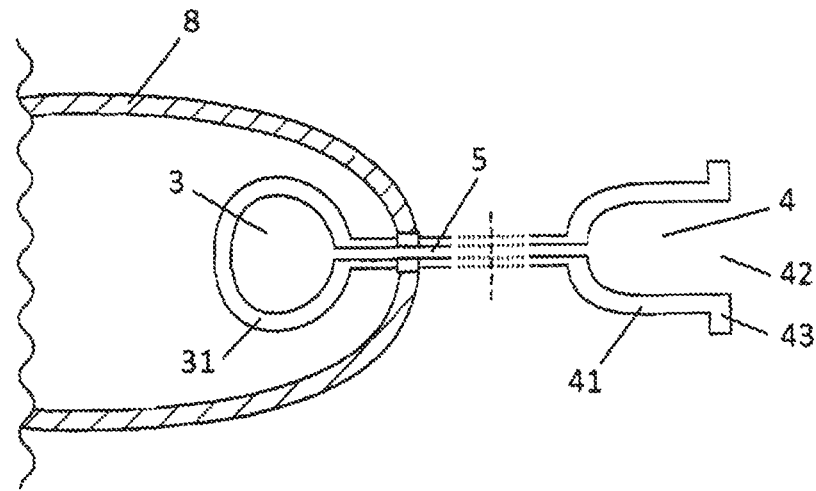


Fig. 12a

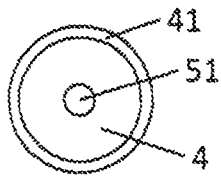


Fig. 12b

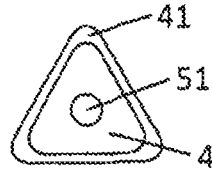


Fig. 12c

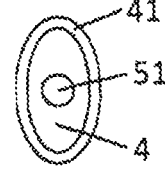


Fig. 12d

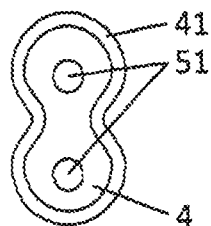


Fig. 12e

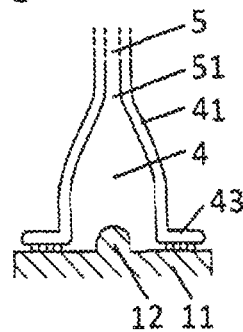


Fig. 12f

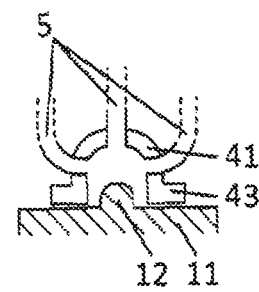


Fig. 13

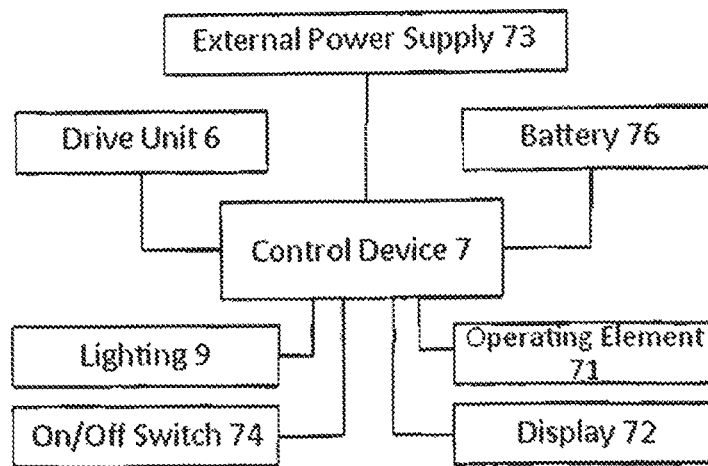


Fig. 14a

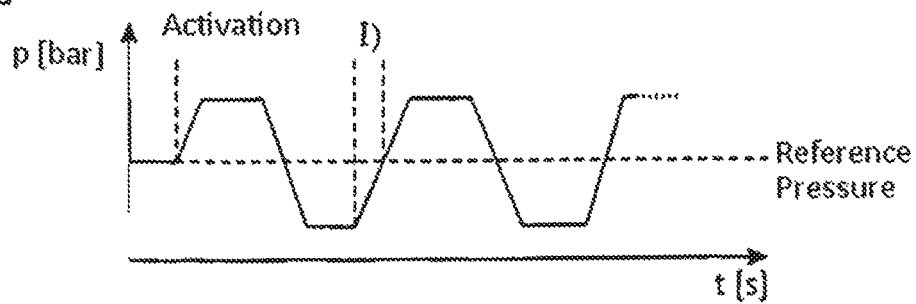


Fig. 14b

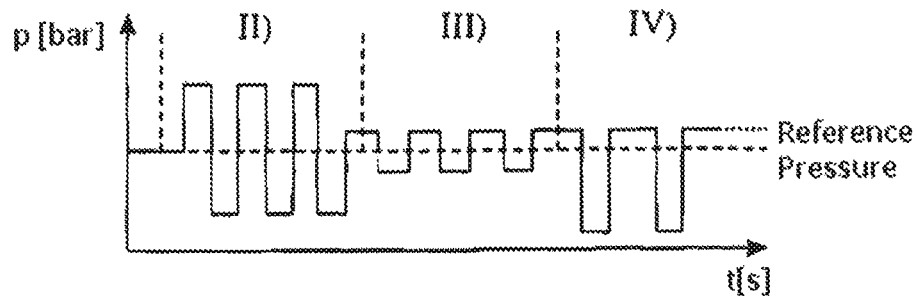
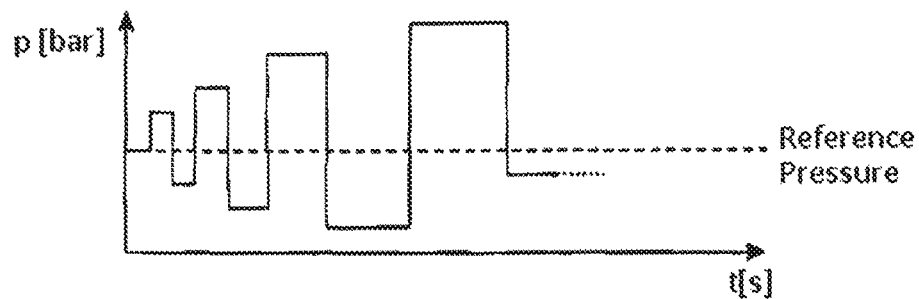


Fig. 14c



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STIMULATION DEVICE**CROSS-REFERENCE TO RELATED APPLICATIONS**

This patent is a Continuation of U.S. patent application Ser. No. 15/354,599, filed Nov. 17, 2016, now U.S. Pat. No. 10,857,063, which is a Continuation of U.S. patent application Ser. No. 15/023,471, filed Mar. 21, 2016, now U.S. Pat. No. 9,763,851, which is a national stage (under 35 U.S.C. 371) of International Patent Application No. PCT/EP2014/065734, filed Jul. 22, 2014, which claims priority to German Patent Application No. 102013110501.7, filed Sep. 23, 2013, the disclosures of which are herein incorporated by reference in their entirety.

TECHNICAL FIELD

Embodiments of the present invention relate to a stimulation device for erogenous zones, in particular for the clitoris, a system with a stimulation device, and methods for stimulating body parts.

BACKGROUND

The erogenous zones of the human body can be stimulated with a variety of tools. For example, vibrators are used to apply a stimulus to a particular area of the skin by direct contact. However, this form of stimulation can lead to irritations or inflammations of the skin. Also, direct contact of the genital area with such tools for individual reasons of hygiene or due to personal reservations, for example, may not be desired.

In particular, the direct stimulation of the clitoris with a clitoral massage vibrator, for example, is fraught with problems, as the clitoris is usually a woman's most sensitive erogenous zone. The entire clitoris is equipped with numerous nerve endings, thus making it particularly touch-sensitive and responsive to sexual stimuli. Here, the clitoris glans, in which the nerve cords of the two thighs meet, should be particularly emphasized. Frequent use of a clitoral massage vibrator for direct stimulation, for example, leads to habituation effects or conditioning of the stimulated erogenous zone and the initial use of such a device may require certain practice or familiarization.

Furthermore, medical studies conducted in 2006 determined the female clitoris as definitive starting point of the female climax and neurologically proved the different qualities of sensation of clitoral (and vaginal) orgasm for the first time. Thus, according to the most recent medical research, the stimulation of the clitoris, rather than the vagina, is considered the starting point of a woman's sexual arousal and thereby the key to female "sexual pleasure".

The sensitivity of the human erogenous zones, such as the clitoris, the inner and outer labia or the nipples, continues to differ greatly individually. The person may be so sensitive that direct stimulation is only possible after prolonged foreplay, and even then only very subtly or ruled out completely. Furthermore, the sensitivity of the corresponding zone can change dramatically from one situation to another or even during a sexual act.

For the aforementioned reasons, various indirect forms of stimulation are common practice as alternatives to direct stimulation.

For indirect stimulation of erogenous zones, and especially the clitoris, conventional vacuum devices are used to arouse the erogenous zones of the person concerned without

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directly contacting the main area to be stimulated. Thus, for example, vacuum pumps for the primary or secondary female sexual organs are known, which usually have a suction cup for placing on the appropriate area and a hand pump. The negative-pressure exerted by this type of device on the clitoris, for example, generates a negative pressure in the clitoris itself, which is usually lower than the systolic blood pressure. This difference in pressure leads to an enlargement of the clitoris and/or stimulates the blood flow in the affected area. This vascular clitoral engorgement serves both to promote desire by increasing sensitivity and for optical and tactile manipulation. The improved blood circulation also leads to an increased leakage of vaginal moisture which makes the stimulation more pleasurable. However, the manual operation of the hand pump is often annoying or distracting. In addition, the long-term or uninterrupted use of negative-pressure in this device category may lead to habituation effects, which limit the effectiveness of the device in the long run. Moreover, a pure increase in the clitoral blood flow is often insufficient to reach a climax; vacuum pumps are thus often used only as foreplay to achieve the climax with a subsequent direct (pressure) massage of the erogenous zone.

Electrically driven vacuum pumps are also used increasingly instead of manually operated vacuum pumps as well. As an example of this, WO 2006/05 82 91 A2 discloses a device for sexual therapy, wherein the arrangement consists of a tubular suction chamber for the clitoris, an electric vacuum source (vacuum pump) and a plurality of airflow openings. The operation of the vacuum pump generates a permanent airflow or air exchange in the chamber in the area of the clitoris. This has the disadvantageous effect of suctioning the increasingly leaking vaginal moisture caused by the negative-pressure, thus having a drying effect on the stimulated parts of skin. Likewise, the suctioned moist air leads to a contamination of the fluidic subsequent vacuum arrangement, of the vacuum pump for example. Such arrangements with vacuum pumps may thus be hygienically problematic, as vacuum pumps and the associated valves or ventilation components often have dead spaces or blind spots and/or are difficult to clean. Furthermore, the device is meant to treat the blood vessels in the clitoris and not to provide stimulation up to sexual climax.

U.S. Pat. No. 6,099,463 A discloses a clitoris stimulation device with a tubular suction chamber, a vacuum source or a vacuum pump and a plurality of valves, which are used to control the size of the vacuum. The vacuum can also be in cyclic form to achieve a stimulation effect, although habituation effects are also to be expected with this device due to the use of a permanent vacuum. As explained above, the disadvantages relating to hygiene and the dehydration of the skin part to be stimulated are also present here. Likewise, the pressure-related arrangement with a plurality of valves, vacuum pump, etc. is relatively complex.

U.S. Pat. No. 6,464,653 B1 discloses therapeutic devices and methods to generate a clitoral engorgement with the aid of a vacuum generated by a vacuum pump to assist in the treatment of clitoral disorders, such as incontinence. A control valve or modulator that can be correspondingly covered by a finger is used to manually adjust or vary the amount of vacuum in the suction chamber. This requires the user's attention and may be distracting or diverting under certain circumstances. This relatively complex device with additional valves also has the same disadvantages relating to hygiene and dehydration as explained above, although the device is also used for long-term therapeutic purposes and not for short-term sexual stimulation.

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WO 2008/028076A2 discloses a therapeutic device for women, which is mainly dedicated to treating sexual disorders. The device includes a combination of indirect stimulation by means of a vacuum chamber and direct stimulation by means of mechanical vibrators and oscillators.

The negative-pressure in this therapeutic device is used to increase the blood flow in the clitoris, while the area of skin is actually stimulated or massaged by means of direct mechanical vibrations/oscillations. Thus, a suction cup for placing on the area of skin to be stimulated is internally connected with a motor via a mechanical connection. The suction cup is extended by the motor once the device is activated, thus increasing the volume of the suction cup. The resulting volume of the suction cup and thus the strength of the vacuum can be adjusted by means of control elements on the device. The air displaced in the device by the suction process is discharged outwardly again via a pipe. The vacuum in this device has only a supporting function, while the actual stimulation ensues directly, which also entails the same disadvantages of a direct stimulation as explained above.

US 2013/001276 9A1 discloses a device in which a pulsating positive-pressure is used for stimulating an air pressure massage. A pump or compressor thus generates a pulsating positive-pressure, which is directed towards the erogenous zone to be stimulated by means of a nozzle. This device disadvantageously causes the affected area of skin to dry out severely or completely. Likewise, there is usually a temperature difference between the temperature of the supplied air and the temperature of the area of skin to be stimulated, which may be felt to be distracting under certain circumstances. The same problems of hygiene as explained above also occur in this device, although in this case any pathogens or germs or other contaminations located in the device are also transported directly to the user's genital area.

Thus, the prior art devices all have the same disadvantage in common, in that the complexity of the arrangements generating negative-pressure or positive-pressure may be high and this device may have problems of hygiene.

Furthermore, the prior art devices have another disadvantage in common, in that habituation effects occur in the event of constant or frequently recurring use of negative-pressures.

Another disadvantage of some of the previously described vacuum devices is, firstly, that the negative-pressure has to be limited by means of a control valve or a vacuum pump and, secondly, that the negative-pressure is supposed to be reduced by means of a manual opening of a release valve, before the suction cup is peeled from the skin. Should one of the valves have a technical defect and/or the user operate the device incorrectly, there may be a risk of injury in certain circumstances.

Thus, in view of the problems as explained above, the problem addressed by the embodiments discussed herein is to provide a stimulation device with a simple construction that is easy and safe to use.

Another problem addressed by the embodiments discussed herein is to provide a stimulation device with an effective stimulation-triggering effect, which is suitable for stimulating an erogenous zone, especially the female clitoris.

In addition, partial problems addressed by the embodiments discussed herein are to provide a device, which prevents the erogenous zones to be stimulated from drying out, is hygienic and prevents habituation effects.

The above problems are addressed by embodiments of the stimulation device described herein. Advantageous devel-

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opments and embodiments are the subject-matter of other alternative independent claims and dependent claims.

SUMMARY

A stimulation device is provided in accordance with one embodiment. The stimulation device includes a chamber which has a flexible wall portion. In one embodiment, the flexible wall portion may include silicon and may be integral with the chamber. A drive unit of the stimulation device is in physical communication with the flexible wall portion so as to cause deflections of the flexible wall portion in opposing directions, thereby resulting in a changing volume of the chamber. The changing volume of the chamber results in modulated positive and negative pressures with respect to a reference pressure. The modulated positive and negative pressures are applied to a body part (e.g., a clitoris) through an opening of the stimulation device. For example, the opening of the stimulation device may be placed over the body part to apply the modulated positive and negative pressures. The drive unit is controlled by a control device of the stimulation device.

In one embodiment, the stimulation device includes a second chamber. The changing volume of the chamber results in the modulated positive and negative pressures in the second chamber.

In one embodiment, the stimulation device may be a portable hand-held device with a battery. The stimulation device may also have an operating element for adjusting the modulated positive and negative pressures and a light emitting diode for indicating a status of the stimulation device.

In accordance with an embodiment, the stimulation device includes a pressure field generator which has a flexible wall portion. A drive unit of the stimulation device is in physical communication with the flexible wall portion so as to cause deflections of the flexible wall portion in opposing directions, thereby resulting in a changing volume of the pressure field generator. The changing volume of the pressure field generator results in modulated positive and negative pressures with respect to a reference pressure. The modulated positive and negative pressures are applied to a body part through an opening of the stimulation device. The drive unit is controlled by a control device of the stimulation device.

In one embodiment, the pressure field generator includes a first chamber and a second chamber. As such, deflections in the flexible wall portion of the first chamber of the pressure field generator result in the modulated positive and negative pressures in the second chamber of the pressure field generator.

The above-described features and functions of embodiments of the present invention as well as other aspects and features are further described in the following with the aid of a detailed description of preferred embodiments with reference to the enclosed illustrations.

BRIEF DESCRIPTION OF DRAWINGS

The figures show in:

FIG. 1 a front view of a first embodiment of the stimulation device according to the invention;

FIG. 2 a perspective side view of the first embodiment of the stimulation device according to the invention;

FIG. 3 a cross-section through section A-A of the first embodiment of the stimulation device shown in FIG. 1 according to the invention;

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FIG. 4 a cross-section through section A-A of a pressure field generator of the stimulation device shown in FIG. 1 according to a first aspect of the present invention in the first state;

FIG. 5 a cross-section through section A-A of a pressure field generator of the stimulation device shown in FIG. 1 according to a first aspect of the present invention in the second state;

FIG. 6 a cross-section through section A-A of a pressure field generator of the stimulation device shown in FIG. 1 according to a first aspect of the present invention in the third state;

FIG. 7 a cross-section through section A-A of a pressure field generator of the stimulation device shown in FIG. 1 according to a second aspect of the present invention;

FIG. 8 a cross-section through section A-A of a pressure field generator of the stimulation device shown in FIG. 1 according to a third aspect of the present invention;

FIG. 9 a cross-section through section A-A of a pressure field generator of the stimulation device shown in FIG. 1 according to a fourth aspect of the present invention;

FIGS. 10 a), b) and c) cross-sections through section A-A of a pressure field generator of the stimulation device shown in FIG. 1 according to a fifth aspect of the present invention;

FIG. 11 a partial cross-section through section A-A of a second embodiment of the stimulation device shown in FIG. 1 according to the invention;

FIGS. 12 a) to f) various bottom and side views of other aspects of a second chamber of the present invention;

FIG. 13 a block diagram of an embodiment of the present invention; and

FIGS. 14 a) to c) diagrams of various pressure modulation patterns of the present invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

According to one embodiment, a pressure field generator in the stimulation device has at least one first chamber and at least one second chamber with at least one opening for placing on a body part or on the erogenous zone and at least one connection element that connects the first chamber with the second chamber.

This embodiment of chambers communicating in a fluidic manner via at least one connection element allows the first chamber to simply generate a pressure field in the second chamber by modifying the volume in the first chamber, which is occasionally directed at the area of skin to be stimulated.

A pressure field is a temporally modifiable field of media pressures, with occasional positive-pressure and occasional negative-pressure, a negative-pressure being a media pressure below the reference pressure and a positive-pressure being a media pressure above the reference pressure.

The medium is usually gaseous, preferably air, but may alternatively or additively, for example, be a liquid medium, such as water or commercially available lubricant. For example, the chambers may be filled with the lubricant prior to using the stimulation device. This allows the corresponding area of skin to be stimulated with a suitable skin-friendly liquid in lieu of air as well, whatever the user's individual preference. As another example, the stimulation device may also be used under water with water as the medium (in the bathtub, for example).

The reference pressure is usually the existing ambient pressure in relation to the stimulation device at the beginning of use (i.e. prior to placing the stimulation device on the

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area of skin to be stimulated). In the preferred use of the stimulation device with air, the reference pressure is the currently existing air pressure or normal pressure.

The pressure field excites the blood circulation of the area of skin to be stimulated, while said area of skin is indirectly massaged, thus combining two advantageous effects. The increased blood circulation makes the erogenous zone of the person concerned more sensitive, while generating an additional massage effect that serves, for example, to stimulate the erogenous zone to sexual arousal up to climax. The massage effect is generated by the kinetic energy of the medium flowing out of the first chamber through the connection element against the surface of the area of skin to be stimulated. The massage effect generated in this way is indirect, i.e. without the area of skin to be stimulated being contacted by a solid body, such as a vibrator, which results in the avoidance of the initially explained disadvantages of direct stimulation.

By the exemplary use of the temporally modifiable pressure field on the clitoris, the pressure field imitates a stimulation that usually only occurs during sexual intercourse. Likewise, the cohabitation movement generates a varying stimulus on the clitoris. It is thus a true-to-life imitation of the natural act of cohabitation, with medical statements confirming that the use of the pressure field causes neither habituation effects nor addiction. This is due in particular to the alternating use of negative- and positive-pressures (or even to the non-continuous use of only one type of pressure).

Furthermore, the maximum applicable pressure is regularly limited by the maximum resilience of the area of skin to be stimulated. Thus, for instance, too high a negative-pressure harbors the risk of painful injury, especially in erogenous zones. Only stimulation devices working with negative-pressures are usually limited to this maximum in their mode of operation. Conversely, the combination of positive- and negative-pressures creates an extended working area of the stimulation-triggering pressure field or effect, as the working area of the pressure can now be exploited to the maximum in both the positive and negative area.

The orientation of the at least one connection element towards the area of skin to be stimulated allows the pressure field to work directly, wherein the pressure field is decisively influenced by the configuration of the at least one connection element and of the at least one opening from the connection element into the second chamber, and is thus adjustable after every use of the stimulation device. Thus, for example, the at least one opening of the connection element may be located opposite and preferably directly opposite the body part to be stimulated. For example, the connection element in a stimulation device intended for the clitoris may have a single passageway with nozzle effect on the clitoris glans between the first and second chamber. Alternatively, the at least one connection element may consist of a plurality, for example four, of passageways between the chambers, if a larger area of skin is to be stimulated.

Furthermore, after placing the halfway or partially opened second chamber on the area of skin to be stimulated, a self-contained system of media- and airflow is created in the pressure field generator. Thus, for instance, the medium or air is moved decisively backwards and forwards between the chambers, while an interchange with media or with air from outside the system being at least largely avoidable. Thus, the first chamber is preferably connected exclusively with the second chamber via or through the connection element. Thus, no first chamber connections other than those to the second chamber exist; for example, there is no direct first

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chamber connection to the environment of the device via a pressure valve or via an air discharge channel.

For example, the air temperature in the flow system rapidly adjusts to the skin temperature, while the distracting supply of new (possibly cold) air from outside the system is avoided, as may be the case, *inter alia*, when using vacuum pumps in prior art. Drying effects are also avoided, as very little or no removal of stimulation-promoting fluid, such as bodily fluid, occurs in a closed system.

Furthermore, due to the simple construction, the pressure field generator has the advantage of increased hygiene and improved cleanability. The pressure field generator thus avoids valves or pumps/compressors with potential dead spaces and places that cannot be cleaned. The pressure field generator is thus easy to clean. For example, the stimulation device can be simply cleaned by filling the first chamber with a cleaning agent and activating the pressure field. Alternatively, the second chamber can be arranged to be replaceable, which also simplifies the cleaning of both chambers. Furthermore, the chambers and the connection element of the pressure field generator can be designed in one-piece, wherein the latter consists of a single molded plastic part (e.g. rubber).

In addition, the construction avoids complex fluidic elements, such as valves, which leads to a simplification in production.

Furthermore, the stimulation device has a drive unit, which modifies the volume in the first chamber in such a way that a pressure field is generated via the connection element in the second chamber that serves to stimulate the erogenous zone, and has a control device that activates the drive unit.

As a matter of principle, the medium transported between the chambers is limited to the maximum volume of the first chamber. In addition, the transported volume can be further constructively limited by the maximum possible volume modification caused by the drive unit.

This means that the maximum positive- or negative-pressure the stimulation device can build up in the second chamber is limited due to the dimensioning of the components of the pressure field generator and of the drive. In particular, the maximum positive- or negative-pressure can be limited to degree that minimizes or excludes any risk of injury for the areas of skin to be stimulated. As a result, any conventional safety valve in prior art or any manual intervention in the stimulation process by the user, such as the opening of a release valve, is rendered unnecessary.

Furthermore, the temporal modification of the pressure field or the modification of the pressure field by the control device is automatically controlled to a large extent. Thus, for example, the modulation of the pressure field, such as intensity, chronological sequence or evolvment, can be pre-saved in the control device. As a preference, the temporal modification of the pressure field can have a regular or reoccurring (stimulation) pattern, such as impulses with a stipulated cycle or regularly alternating impulse sequences. This allows the user's interaction with the stimulation device to be limited to switching on and off and selecting the stimulation pattern, while the stimulation device automatically executes the preferred stimulation pattern. Thus, the user complexity of the stimulation device is low, especially when compared with conventional (medical) vacuum stimulation devices. Alternatively, or additionally, the stimulation pattern of the stimulation device can be individually configured by the user during or before operation.

In one embodiment, a system includes the stimulation device and a remote control device. The remote control

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device is arranged separately from the stimulation device, wherein the control device of the stimulation device is remotely controlled by the remote control device. This allows a conventional wireless (via radio for example) or wired remote control to be employed, in order to allow the remote controlled moderation of the stimulation device or the activation thereof by another user.

In one embodiment, a method for stimulating body parts, especially the clitoris, is disclosed. The associated advantages effects and impacts are explained in more detail above in relation to the pressure field.

In one embodiment, the stimulation device is used as a sex toy for stimulating the female clitoris. As explained at the beginning, the female clitoris is an especially erogenous zone of women, which is why the use of an indirect massage combined with a negative-pressure—stimulation for this body part to provide stimulation up to orgasm seems particularly advantageous.

With reference to FIG. 1, a front view of a first embodiment of stimulation device 1 is explained, wherein FIG. 2 shows a perspective view and FIG. 3 a cross-section of the first embodiment of stimulation device 1 according to one or more embodiments.

The first embodiment of stimulation device 1 is a preferably electric or small device, comprising a housing 8, a pressure field generator 2, operating elements 71, a display 72, an on/off switch 74, a socket 75, an optional battery 76 and optional lighting 9.

Housing 8 is preferably designed so ergonomically that it can be held comfortably in one hand and has no sharp or pointed edges. Furthermore, housing 8 may consist of plastic, such as polycarbonate (PC) or acrylonitrile butadiene styrene (ABS). In addition, the gripping areas or even the entire housing may be supplemented by or designed in a haptically advantageous silicone. Housing 8 is preferably designed to be at least water-resistant or splash-proof, for example protection class IP 24.

Operating elements 71 are used to adjust the device operating mode, i.e. to adjust the pressure field modulation pattern. Operating elements 71 can, for example, be designed as at least one pushbutton, as at least one rotary switch, or as at least one touch-sensitive switch. Furthermore, operating elements 71 can produce an optical feedback for activating light emitting diodes (LED) integrated in the center of the switch, for example.

An optional display 72 serves to inform the user of the device status and/or the setting status. Display 72 can for example be configured as a plurality of light diodes or as an LCD display. The displayed information can, for example, be the charge status of an optional battery or the current setting of the modulation pattern.

On/off switch 74 is used for activating and deactivating stimulation device 1. This on/off switch 74 can, for example, be a pushbutton, which switches stimulation device 1 on or off when held down, or a ratcheting slide switch.

A socket 75 is used to supply the external power of stimulation device 1 via an external plug 73, which is connected to an external power adapter, for example. To ensure stimulation device 1 is splash-proof, a magnetic-inductive transformer may be provided instead of the socket, which allows power to be transmitted to stimulation device 1 without any electroconductive contact. Stimulation device 1 preferably also has a battery, such as a nickel metal hydride battery (NiMH) for wireless operation. Alternatively, a (longer) power supply cable may also be led out of the stimulation device.

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Pressure field generator 2 of a first embodiment has a first chamber 3 in the interior of stimulation device 1, a second chamber 4 for placing on a body part 11 to be stimulated, and a connection element 5, which connects the first chamber 3 with the second chamber 4.

A drive unit 6, such as an electric motor, drives the first chamber 3 via an axis 61 and by means of an eccentric 62 (or alternatively by means of a connecting rod) in such a way that the volume of the first chamber 3 is modified according to the rotation of axis 61 of drive unit 6. It is hereby annotated that any drive types causing a deflection in wall 31 of the first chamber 3 for volume modification can basically be used in stimulation device 1. The latter may, for example, occur hydraulically, pneumatically, piezoelectrically, mechanically or electromagnetically. Examples of this are described in more detail later on.

A control device 7 activates drive unit 6, operating elements 71 and display 72. Control device 7 and drive unit 6 are supplied with power by internal battery 76 and/or external power supply 73.

Optional lighting 9 is provided on or in housing 8. Lighting 9 is preferably used for lighting the interior of the second chamber 4. Lighting 9 can either be switched by the user or automatically activated by activating stimulation device 1. Furthermore, lighting 9 can be composed of energy-saving light diodes. The lighting can, for example, serve as an orientation aid in the dark for the user of stimulation device 1 or as additional optical stimulation.

With reference to FIGS. 4, 5 and 6, the construction and function of a first aspect of pressure field generator 2 of stimulation device 1 is subsequently described in more detail.

FIG. 4 shows pressure field generator 2 in a first state, with the second chamber 4 being placed on the area of skin or body part 11 to be stimulated. The first state of pressure field generator 2 is characterized by a neutral deflection of the first chamber 3, i.e. no external force is exerted on the first chamber 3, for example, by the drive unit. Here, volume V1 of the first chamber is the standard volume of this chamber 3.

The body part 11 to be stimulated is an area of skin on the body, wherein for example an especially sensitive erogenous zone, clitoris 12, is shown. The use of the stimulation device 1 is thus not limited to the female clitoris 11, instead stimulation device 1 can be used on all body parts or erogenous zones (such as the inside of the upper thighs, the loins, neck, nipples, etc.), which can be stimulated by means of media- or air-pressure massage and/or negative-pressure.

Due to being placed on the body part 11 to be stimulated, the second chamber 4 forms a chamber largely or completely sealed off from the exterior of pressure field generator 2, which is only still connected to the second chamber via connection element 5, wherein the edges of chamber 4 ideally form an air-tight bond with the surface of body part 11. Two communicating chambers 3 and 4 are created in this way, wherein corresponding pressure equalization via connection element 5 ensues between chambers 3 and 4 in the event of a volume modification in one of chambers 3 or 4.

Wall 31 of the first chamber 3 is secured by means of a holder 32. Holder 32 is in turn attached to housing 8. Wall 41 of the second chamber is further affixed to holder 32. Two mutually aligned openings in wall 41 of the second chamber and of holder 32 jointly form connection element 5, which connects the first chamber 3 and the second chamber 4. Wall 31, holder 32 and wall 41 are preferably adhered to each other media- or air-tightly. Alternatively, the latter can also be press-fitted or screwed together with each other (for

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example by means of sealing areas between housing 8 and the respective part). Holder 32 can also be adhered or screwed onto housing 8, for example.

Wall 31 of the first chamber 3 preferably consists of a flexible media- or airtight material, such as rubber. Holder 32 preferably consists of a rigid plastic, which is just as media- and airtight. Wall 41 of the second chamber is preferably made of a flexible, skin-friendly material, such as silicone or rubber.

FIG. 5 shows pressure field generator 2 of FIG. 4 in a second state, wherein the second chamber 4 is in turn placed on the body part 11 to be stimulated. The second state is characterized in that a force A affecting the first chamber 3 causes chamber 3 to expand. In detail, force A in this embodiment draws wall 31 of the first chamber 3 in a direction facing away from the second chamber 4.

Volume V2 in chamber 3 increases as a result, i.e., $V2 > V1$. To equalize the difference in pressure created between chambers 3 and 4, the media or air now flows from the second chamber 4 into the first chamber 3.

Assuming that the first state of the present pressure in chambers 3 and 4 corresponds to the currently prevailing external reference pressure (air pressure for example); the present overall pressure in the second state will now be less than the external reference pressure. This negative-pressure is designed in such a way that it is preferably less than the usual systolic blood pressure in the blood vessels of body part 11. The blood circulation in this area thus increases and clitoris 12 is better supplied with blood in the second state.

FIG. 6 shows pressure field generator 2 in a third state, wherein the second chamber 4 is in turn placed on the body part 11 to be stimulated. The third state is characterized in that a force B influencing the first chamber 3 causes a volume reduction or compression in chamber 3. In detail, the direction of force B is opposed to the direction of force A and distorts wall 31 of the first chamber in such a way that the resulting volume V3 of the chamber is less than volume V1. The compression of chamber 3 causes a positive-pressure in chamber 3, which is equalized by a media- or airflow through connection element 5 in the direction of the second chamber 4.

This media flow is now preferably directed by the orientation of opening 51 and/or of connection element 5 towards the body part 11 to be stimulated, in particular towards the glans of clitoris 12. The indirect (pressure) massage ensues due to the medium flowing onto body part 11. The size of opening 51 is dimensioned in such a way that it is small enough in ratio to the volume displaced in the first chamber 3 to sufficiently accelerate the medium for a perceptible massage effect.

Furthermore, the type of flow can not only be advantageously influenced by the size and orientation of opening 51, but also by the inner configuration of the connection element. For example, helix-shaped grooves in connection element 5 can cause the flow to swirl, wherein the flow profile of the flow unfurls a "softer" or more turbulent effect on the body part to be stimulated. Alternatively, the resulting pressure field in the second chamber 4 can be adjusted by means of a plurality of openings 51, depending on use.

The advantageous factor of the arrangement shown in FIGS. 4 to 6 is that it is hygienically unproblematic (due to the avoidance of dead spaces, for example) and is simple to produce. For example, no valves or other openings in or on the first chamber 3 are required.

FIG. 7 shows one embodiment of an alternative construction of pressure field generator 2. Walls 31 and 41 of the first and second chambers 3 and 4 respectively can thus engage

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with one another in such a way that they also form two communicating chambers with a connection element 5, as in the first aspect of the construction of pressure field generator 2. Thus, the separate holder is no longer required, while the second chamber 4 is replaceable. In addition, connection element 5 can be designed integrally or in one-piece with wall 41 of the second chamber 4. A replaceable chamber 4 has the advantage of allowing the use of any shapes of chamber 4 adjusted to the respective body part (a more detailed description thereof is provided later), without the entire stimulation device 1 needing to be replaced. Alternatively, the second chamber 4 can also be pluggably affixed to housing 8 (not shown in more detail). Wall 31 of the first chamber 3 can be adhered or screwed onto housing 8, for example.

Also, as shown in more detail in FIG. 7 by the broken line and double arrow C, the first chamber 3 is expanded and compressed by a force exerted perpendicularly to the axial direction of connection element 5. In principle, the force exerted directly or indirectly on the first chamber 3 by drive unit 6 can be exerted from any direction. The only decisive criterion here is that the volume of the first chamber 3 can be increased and decreased by drive unit 6.

FIG. 8 shows one embodiment of an integral or one-piece structure of pressure field generator 2. An elastic material, such as silicone or rubber, can be used as material for chambers 3 and 4. The advantage here is that any hygienically unsafe divide is avoided and the production effort is reduced. Pressure field generator 2 can be adhered or screwed onto housing 8 in this case too. Any modification of the volume in the first chamber 3 is analogous here, as described in conjunction with FIG. 7.

FIG. 9 shows one embodiment of an alternative construction of pressure field generator 2. The second chamber 4, a plurality of connection elements 5, as well as partial sections of wall 31 of the first chamber 3 are designed in one-piece. Alternatively, pressure field generator 2 can be constructed in two or more pieces from individual components, while safeguarding the geometrical example of FIG. 9 in a similar way to that shown in FIG. 4 or 7.

The volume in chamber 3 is modified in a similar way to a piston pump, although no valves are available here. A piston 63 is thus moved backwards and forwards by the drive unit, for example an electric motor or electromagnet, in the directions of the double arrow D. This type of drive has the advantage that the volume of the first chamber 3 can be simply reduced to zero or almost zero, thus allowing the first chamber 3 to be almost completely emptied.

The embodiment of connection element 5, with a plurality of channels 52 and openings 51, leads to a distribution of the pressure field to a plurality of concentration points. While the embodiment of connection element 5 with only one channel, as described in conjunction with FIG. 6, leads to the formation of a strongly concentrated media- or airflow on a target area, the embodiment of connection element 5 shown in FIG. 9 allows the media- or airflow to be distributed to a plurality of target areas, thus allowing clitoris 11 to be blown not just on its glans, but equally from a plurality of directions as well, for example. Depending on use, this distribution of the airflow concentration to a plurality of areas can help to avoid any overstimulation and/or help to increase the stimulation area.

FIGS. 10a to 10c show (partial) cross-sections of one embodiment of a construction of pressure field generator 2 with a bending element 64 as drive for modifying the volume in the first chamber 3. Bending element 64 can, for example, be a conventional piezoelectric bending element,

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which distorts or bends once voltage is applied. In this embodiment wall 31 of the first chamber 3 is a rigid or stiff construction, while bending element 64 is suitably dovetailed to the sides of the first chamber 3. The transition points between bending element 64 and wall 31 are sealed (elastically bonded for example). The drive for pressure field generator 2 is already integrated in this construction and an external drive is not required. An electric motor with an eccentric is not needed, for example. This allows, inter alia, the reduction of any disturbing natural oscillations due to the eccentric movement of the stimulation device.

In detail, FIG. 10a shows pressure field generator 2 with bending element 64 in a neutral position. Thus, the volume of the first chamber 3 with bending element 64 in the neutral position is the standard volume. FIG. 10b also shows the first chamber 3 with an excited and, consequently, outwardly bent bending element, while the volume of the first chamber 3 is increased, with a negative-pressure consequently prevailing in pressure field generator 2. FIG. 10c shows a bending element of the first chamber 3 excited in the opposite direction to FIG. 10b, which is why the volume in the first chamber 3 has decreased, with a positive-pressure consequently prevailing in pressure field generator 2.

FIG. 11 shows one embodiment with a locally separated arrangement of chambers 3 and 4 of pressure field generator 2. Chambers 3 and 4 are connected via an extended connection element 5, which can be a longer flexible hose or even a rigid pipe. For example, connection element 5 may be 0.5 m in length. This enables housing 8 to be held in one hand, while the other hand holds the second chamber 4 on the body part 11 to be stimulated; or one can simply lay housing 8 aside, while the user holds only the second chamber 4 in his/her hands. The stimulation device in this embodiment can also be designed as a table device.

FIGS. 12 a) to 12 f) show various bottom and side views of other aspects of the second chamber 4 in accordance with one or more embodiments. In detail, FIG. 12 a) shows a bottom view of a circular second chamber 4 with a centrally arranged opening 51; FIG. 12 b) a bottom view of a triangular second chamber 4 with a centrally arranged opening 51; FIG. 12 c) a bottom view of an oval second chamber 4 with a centrally arranged opening 51; and FIG. 12 d) a bottom view of an almost eight-shaped second chamber 4 with two openings 51 shifted to the center. FIG. 12 e) further shows a side cross-section of a second chamber 4, wherein the second chamber 4 has an additional extended contact surface 43 to the skin or a support part 43 to improve the sealing function of the second chamber 4 on the skin. The extended contact surface 43 may also have grooves or projections that improve the sealing function even more. FIG. 12 f) shows a side cross-section of a second chamber 4 with a plurality of separate connection elements 5 and an extended contact surface due to support part 43.

In principle, the form of the second chamber 4 can thus be adjusted to the anatomy of the erogenous zone to be stimulated. The form of chamber 4 in FIG. 12 a) is, for example, adjusted to the round shape of the breast, while the form of chamber 4 in FIG. 12 c) is better suited to the form of the female vulva. Furthermore, the shape of the second chamber 4 also determines the characteristic of the pressure field. The size of the second chamber 4 in ratio the volume displaced from chamber 3 thus determines the amount of the achievable negative- or positive-pressure. Furthermore, the proximity of opening 51 of connection element 5 to the area of skin to be stimulated can also be used to determine the intensity of the massage effect on said area of skin. A plurality of openings 51, cf. FIG. 12 d) allows the massage

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effect to be distributed to a plurality of areas. Thus, for example, the clitoris can be less directly stimulated at the very sensitive clitoris glans (cf. FIG. 12 *e*), and more stimulated at the areas surrounding the clitoris glans, in order to prevent overstimulation of the clitoris.

FIG. 13 shows a block diagram of an example of the functional construction of an embodiment with a control device 7, a drive unit 6, lighting 9, an on/off switch 74, operating elements 71, a battery 76 and an external power supply 73.

Control device 7, which has a microcontroller or is hardwired, for example, initially controls the power supply of all users of stimulation device 1, as well as an optional charging and discharging process of battery 76 and/or a battery management. In particular, control device 7 controls the excitation of drive unit 6, such as the size of the deflection, the frequency, the modulation, etc.

Furthermore, control device 7 may have a memory in which at least one modulation or stimulation pattern (described in more detail in conjunction with FIG. 14 *a*) is saved. The excitation of drive unit 6 can now be activated via operating elements 71 in compliance with the previously saved stimulation pattern at the discretion of the user of stimulation device 1. The stimulation pattern of the pressure field can also be optionally and individually adjusted and saved by the user via the operating elements.

FIG. 14 *a*) shows the chronological sequence of a total pressure *p* in the pressure field generator (2) when using the latter for stimulation. The broken line provides the reference pressure, such as the currently prevailing atmospheric pressure that exists outside the pressure field generator (2). If the second chamber 4 is now placed on body part 11 to be stimulated, the originally prevailing ambient pressure in the pressure field generator (2) is maintained, for example. It is now assumed that the second chamber 4 is sealed tightly to the body part to be stimulated for the most part. Once the stimulation device is activated, drive unit 6 is activated or excited by control device 7 according to a previously saved stimulation pattern. Accordingly, the volume of the first chamber 3 and thus the total pressure in pressure field generator 2 are modified, with the pressure modifications being modified to the reference pressure. The pressure or stimulation pattern shown as an example in FIG. 14 *a*) develops a pulsed, regular pressure field. In phases of pressure increase, the erogenous zone to be stimulated is blown on or massaged, while in the times when a negative-pressure prevails, the blood circulation of body part 11, the clitoris for example, is promoted. Thus, time periods exist (designated in FIG. 14 *a*) as I)) in which a negative-pressure prevails, while the clitoris is simultaneously indirectly massaged. FIG. 14 *b*) shows three examples of alternative stimulation patterns. Thus, the area designated as II) shows a pulsed stimulation pattern with high amplitude. The area designated as III) shows a pulsed stimulation pattern with low amplitude. Furthermore, the area designated as IV) illustrates an irregular and asymmetrical stimulation pattern as regards chronological sequence and amplitude. The patterns can be varied according to individual bodily effect/use and according to individual wishes.

FIG. 14 *c*) shows another example of an alternative stimulation pattern. The strength of pressure may, for example, increase with time, in order to adjust to the user's state of excitement.

In addition to the explained embodiments, other basic design principles are allowed. For example, different arrangements or constructions of the first chamber 3 may be arbitrarily combined with various embodiments of the sec-

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ond chamber 4 or connection element 5. For example, the first chamber 3 with the drive in FIG. 10 can be combined with the second chamber in FIG. 12 *f*).

Although only one first chamber 3 is shown in all embodiments, two or more first chambers 3 may be present, which are then appropriately activated simultaneously or time-delayed in such a way that their volume is modified in order to build up a pressure field.

Although only one opening from the first chamber 3 to connection element 5 is shown in all embodiments, a plurality of openings for a connection element 5 or even more openings for a plurality of connection elements 5 may be present in the first chamber 3.

A stimulation device 1 can have a plurality of pressure field generator 2. Thus, for example, two pressure field generators may be available to stimulate two erogenous zones simultaneously.

The stimulation patterns can deviate from the patterns shown in FIGS. 14 *a*), *b*) and *c*), as long as they have a chronological sequence of over- and negative-pressures. For example, a relatively long-lasting negative-pressure can initially be built up at the beginning or after activation of the device (3 minutes for example), in order to effectively increase the blood circulation of the zone to be stimulated, whereupon pulsed negative- and over-pressures of a slowly increasing amplitude then follow.

LIST OF REFERENCE NUMERALS

- 1 Stimulation device
- 2 Pressure field generator
- 3 First chamber
- 4 Second chamber
- 5 Connection element
- 6 Drive unit
- 7 Control device
- 8 Housing
- 9 Lighting
- 11 Body part
- 12 Clitoris
- 31 Wall of first chamber
- 32 Holder
- 41 Wall of second chamber
- 42 Opening of second chamber
- 43 Contact surface
- 51 Opening of connection element to second chamber
- 61 Drive shaft
- 62 Eccentric
- 63 Piston
- 64 Bending element
- 71 Operating element
- 72 Display
- 73 Power supply
- 74 On/off switch
- 75 Socket
- 76 Battery
- 77 Control board

The invention claimed is:

1. A stimulation device comprising:
 - a chamber having a flexible wall;
 - a drive unit in physical communication with the flexible wall to cause at least a portion of the flexible wall to deflect in opposing directions, thereby resulting in a changing volume of the chamber, the changing volume of the chamber resulting in modulated positive and negative pressures with respect to an ambient pressure;

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an opening configured to sealingly engage a portion of a body of a user including a clitoris, the modulated positive and negative pressures to be applied to the portion of the body via the opening, the opening being a sole opening of the chamber to an exterior of the stimulation device;

a control device configured to receive input from the user and control the drive unit to cause the at least the portion of the flexible wall to deflect to create the modulated positive and negative pressures based on modulated frequencies; and

a housing enclosing the drive unit and the control device.

2. The stimulation device of claim 1, wherein the modulated positive and negative pressures are to affect a flow of blood to the clitoris.

3. The stimulation device of claim 1, wherein the opening is configured to be placed over a clitoris glans.

4. The stimulation device of claim 1, wherein the flexible wall is integral with the chamber.

5. The stimulation device of claim 1, wherein the flexible wall includes silicone.

6. The stimulation device of claim 1, wherein the stimulation device is a portable hand-held device including a battery.

7. The stimulation device of claim 1, wherein the housing includes a water resistant material.

8. The stimulation device of claim 7, wherein the water resistant material includes acrylonitrile butadiene styrene (ABS).

9. The stimulation device of claim 1, further including an operating element in communication with the drive unit to cause the drive unit to adjust the creation of the modulated positive and negative pressures.

10. The stimulation device of claim 1, wherein the drive unit is to cause the at least the portion of the flexible wall to deflect based on one or more stimulation patterns.

11. The stimulation device of claim 1, wherein the opening is formed in a flexible material.

12. The stimulation device of claim 11, wherein the flexible material includes silicone.

13. The stimulation device of claim 11, wherein at least a portion of the flexible material protrudes from the housing.

14. The stimulation device of claim 11, wherein the flexible wall and the flexible material form one piece.

15. The stimulation device of claim 11, wherein the flexible wall includes a first material and the flexible material includes a second material different from the first material.

16. The stimulation device of claim 1, wherein the opening has a first width defined by an edge of the opening that is to contact the portion of the body, and a portion of the housing including the flexible wall has a second width, the second width greater than the first width.

17. The stimulation device of claim 1, wherein the flexible wall is to sealingly separate the drive unit from the portion of the body.

18. The stimulation device of claim 1, wherein the chamber is a first chamber and further including a second chamber.

19. A stimulation device comprising:

a pressure field generator including a first chamber and a second chamber, the first chamber including a flexible wall;

a drive unit in physical communication with the flexible wall to cause at least a portion of the flexible wall to

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deflect in opposing directions, thereby resulting in a changing volume of the first chamber, the changing volume of the first chamber resulting in modulated positive and negative pressures with respect to an ambient pressure;

an opening configured to sealingly engage a portion of a body of a user including a clitoris, the modulated positive and negative pressures to be applied to the portion of the body via the opening, the opening being a sole opening of the pressure field generator to an exterior of the stimulation device;

a control device configured to receive input from the user and control the drive unit to create the modulated positive and negative pressures based on modulated frequencies; and

a housing enclosing the drive unit and the control device.

20. The stimulation device of claim 19, wherein the modulated positive and negative pressures are to affect a flow of blood to the clitoris.

21. The stimulation device of claim 19, wherein the opening is configured to be placed over a clitoris glans.

22. The stimulation device of claim 19, wherein the flexible wall is integral with the first chamber.

23. The stimulation device of claim 19, wherein the flexible wall includes silicone.

24. The stimulation device of claim 19, wherein the stimulation device is a portable hand-held device including a battery.

25. The stimulation device of claim 19, wherein the housing includes a water resistant material.

26. The stimulation device of claim 25, wherein the water resistant material includes acrylonitrile butadiene styrene (ABS).

27. The stimulation device of claim 19, further including an operating element in communication with the drive unit to cause the drive unit to adjust the creation of the modulated positive and negative pressures.

28. The stimulation device of claim 19, wherein at least a portion of the pressure field generator protrudes from the housing.

29. The stimulation device of claim 28, wherein the at least the portion of the pressure field generator protruding from the housing includes a flexible material.

30. The stimulation device of claim 29, wherein the flexibility of the material of the at least the portion of the pressure field generator protruding from the housing is greater than a flexibility of a material of the housing.

31. The stimulation device of claim 29, wherein the flexible wall and the at least the portion of the pressure field generator protruding from the housing form an integral surface.

32. The stimulation device of claim 29, wherein the flexible wall includes a first material and the at least the portion of the pressure field generator protruding from the housing includes a second material different than the first material.

33. The stimulation device of claim 19, wherein at least a portion of the flexible wall is supported by the housing.

34. The stimulation device of claim 19, wherein the drive unit is to cause the at least the portion of the flexible wall to deflect based on one or more stimulation patterns.

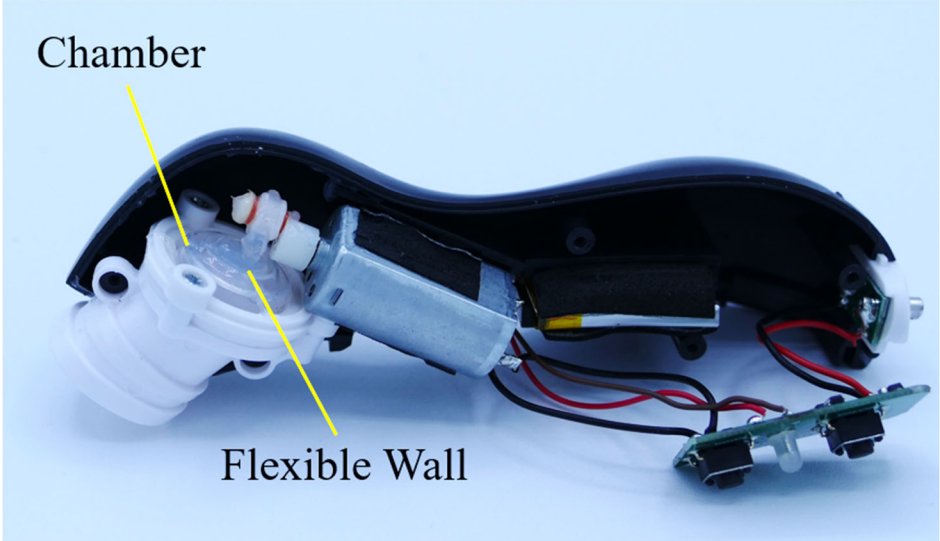
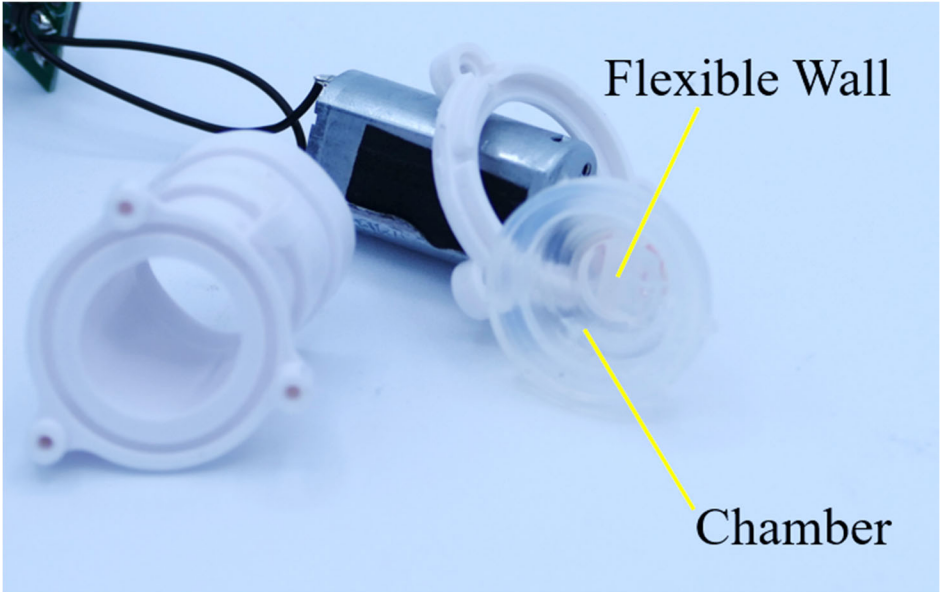
35. The stimulation device of claim 19, wherein the flexible wall is to sealingly separate the drive unit from the portion of the body.

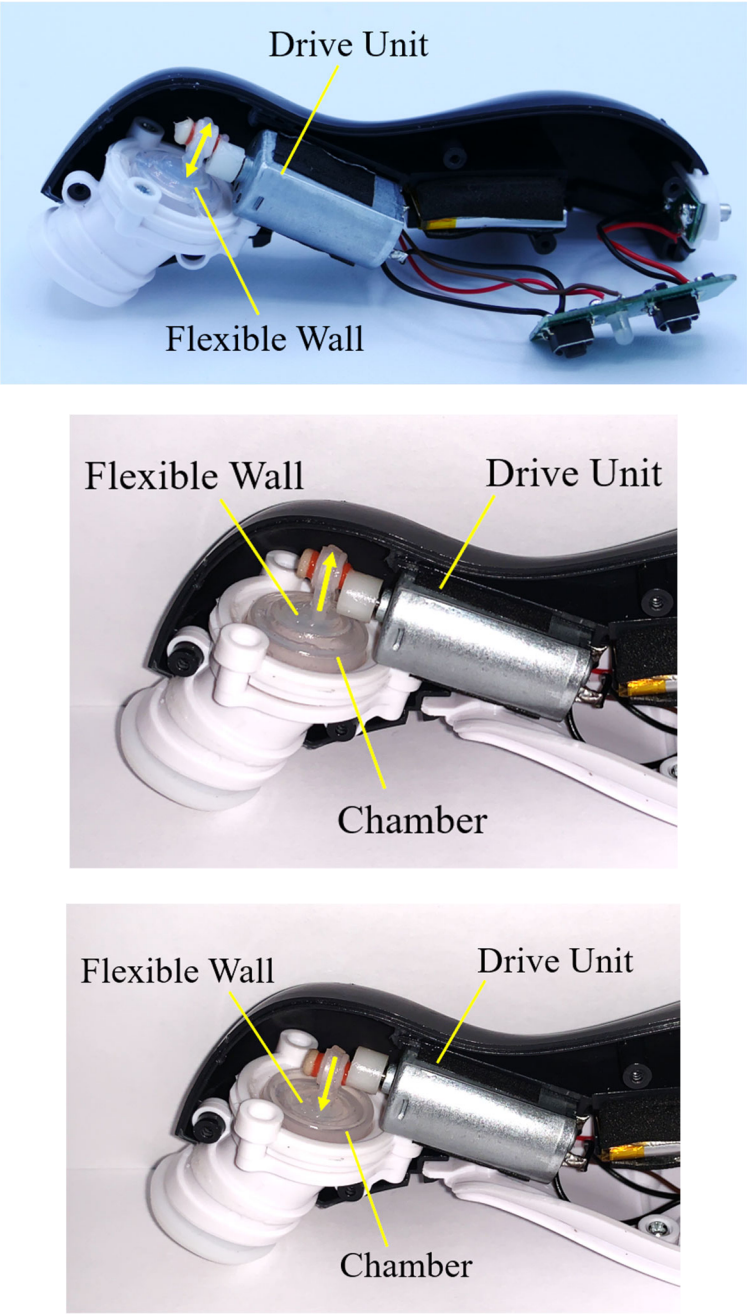
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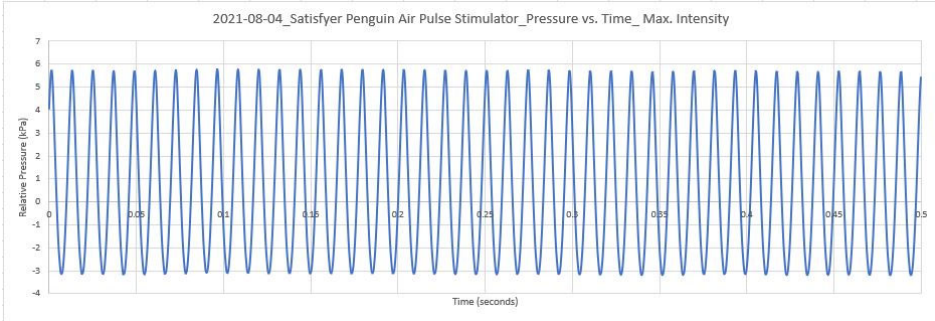
Exhibit 10

**REPRESENTATIVE CLAIM CHART 2:
SATISFYER PENGUIN AIR PULSE STIMULATOR AND
CLAIM 1 OF U.S. PATENT NO. 11,103,418 (“’418 PATENT”)**

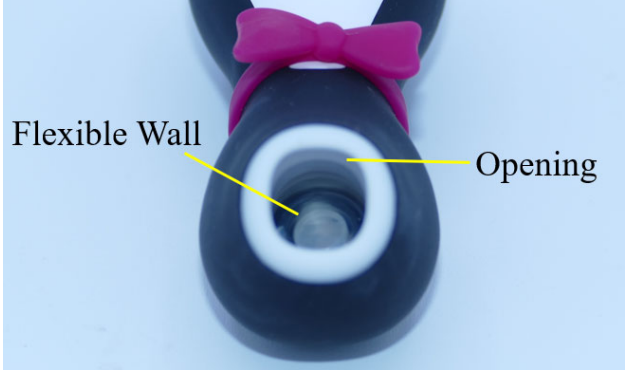

Claim Language of the ’418 Patent	Satisfyer Penguin Air Pulse Stimulator
1. A stimulation device comprising:	<p>The Satisfyer Penguin Air Pulse Stimulator is a stimulation device:</p>   <p>The packaging of the Satisfyer Penguin Air Pulse Stimulator shows the device is a stimulation device for a clitoris:</p> <p style="text-align: center;"><i>“Pressure wave and touch-free clitoral stimulation”</i></p> 

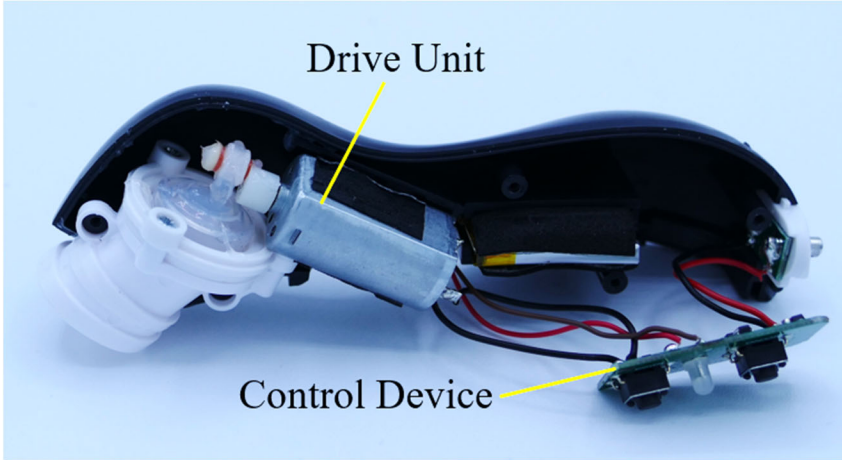
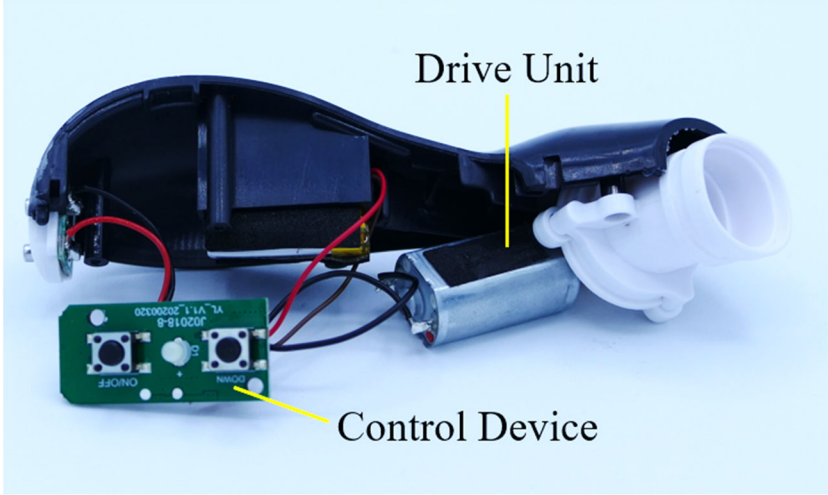
Claim Language of the '418 Patent	Satisfyer Penguin Air Pulse Stimulator
a chamber having a flexible wall;	<p>The Satisfyer Penguin Air Pulse Stimulator has a chamber having a flexible wall.</p> <p>The following annotated photographs of a disassembled Satisfyer Penguin Air Pulse Stimulator show a chamber with its flexible wall:</p> <div><p>Chamber</p><p>Flexible Wall</p><p>This photograph shows the internal components of the Satisfyer Penguin Air Pulse Stimulator. A yellow line points from the label 'Chamber' to a white, cylindrical component. Another yellow line points from the label 'Flexible Wall' to a clear, flexible, circular wall within the chamber. The device is shown in a disassembled state, with the black outer casing removed, revealing the internal motor, wiring, and electronic components.</p></div> <div><p>Flexible Wall</p><p>Chamber</p><p>This photograph shows the internal components of the Satisfyer Penguin Air Pulse Stimulator from a different angle. A yellow line points from the label 'Flexible Wall' to a clear, flexible, circular wall. Another yellow line points from the label 'Chamber' to a white, cylindrical component. The device is shown in a disassembled state, with the black outer casing removed, revealing the internal motor, wiring, and electronic components.</p></div>

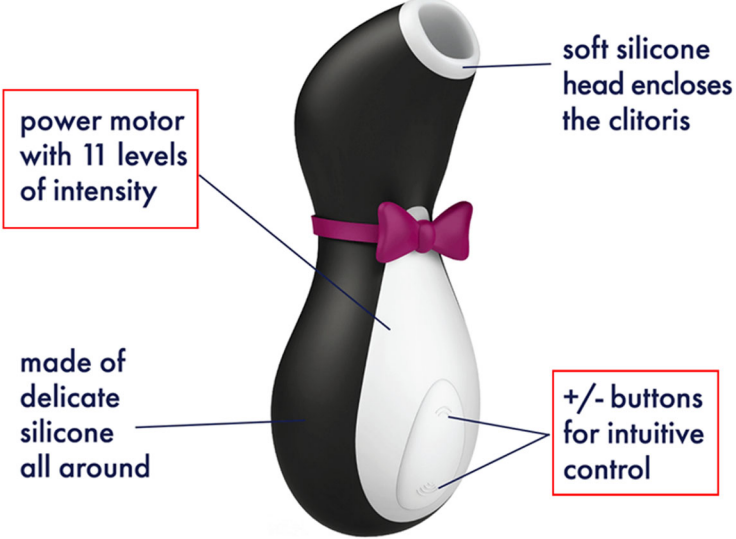
Claim Language of the '418 Patent	Satisfyer Penguin Air Pulse Stimulator
<p>a drive unit in physical communication with the flexible wall to cause at least a portion of the flexible wall to deflect in opposing directions, thereby resulting in a changing volume of the chamber, the changing volume of the chamber resulting in modulated positive and negative pressures with respect to an ambient pressure;</p>	<p>The drive unit of the Satisfyer Penguin Air Pulse Stimulator is in physical communication with the flexible wall to cause at least a portion of the flexible wall to deflect in opposing directions, thereby resulting in a changing volume of the chamber, the changing volume of the chamber resulting in modulated positive and negative pressures with respect to an ambient pressure, as shown in the following annotated photographs:</p>  <p>The first photograph shows the drive unit (a small motor) connected to the flexible wall (a white plastic component) via a yellow arrow. The second and third photographs show the drive unit and flexible wall in different positions, with the flexible wall deflected in opposing directions, as indicated by the yellow arrows. The labels 'Drive Unit', 'Flexible Wall', and 'Chamber' are used to identify the components in each photograph.</p>

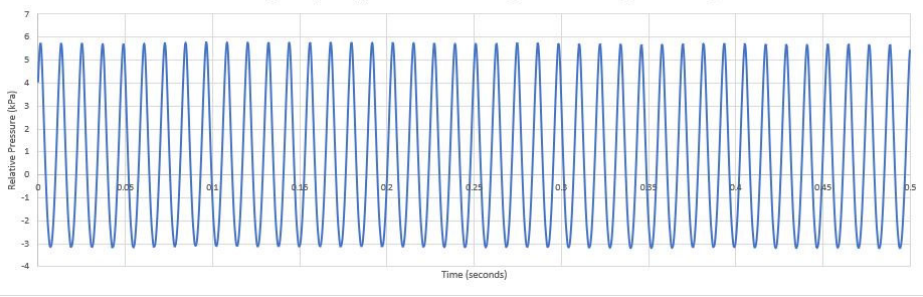
Claim Language of the '418 Patent	Satisfyer Penguin Air Pulse Stimulator
	<p>The graph below shows the modulated positive and negative pressures with respect to ambient pressure resulting from the changing volume of the chamber. In the graph, 0 kPa represents the ambient pressure.</p> <p>The graph shows the resulting modulated positive pressures (pressure measurements greater than 0 kPa) and negative pressures (pressure measurements less than 0 kPa) with respect to ambient pressure measured by a differential pressure sensor, <i>i.e.</i>, a pressure sensor measuring pressure changes against the prevailing ambient pressure (not measurement of absolute pressure by an absolute pressure sensor).</p> 

Claim Language of the '418 Patent	Satisfyer Penguin Air Pulse Stimulator
<p>an opening configured to sealingly engage a portion of a body of a user including a clitoris, the modulated positive and negative pressures to be applied to the portion of the body via the opening, the opening being a sole opening of the chamber to an exterior of the stimulation device;</p>	<p>The Satisfyer Penguin Air Pulse Stimulator includes an opening configured to sealingly engage a portion of a body of a user including a clitoris, the modulated positive and negative pressures to be applied to the portion of the body via the opening, the opening being a sole opening of the chamber to an exterior of the stimulation device.</p> <p>The following annotated photographs of a Satisfyer Penguin Air Pulse Stimulator and its Quick Start Guide show an opening configured to sealingly engage a portion of a body of a user including a clitoris, that the opening is the sole opening of the chamber to an exterior of the stimulation device, and that the modulated positive and negative pressures are applied to the portion of the body via the opening:</p> <div> <p>This photograph shows the exterior of the Satisfyer Penguin Air Pulse Stimulator. It is a black, teardrop-shaped device with a pink bow attached to the middle. A yellow line points to a small white circular opening at the tip, labeled 'Opening'.</p> </div> <div> <p>This photograph shows the internal components of the Satisfyer Penguin Air Pulse Stimulator. The device is disassembled, revealing the internal structure. A yellow line points to a white, flexible-looking wall, labeled 'Flexible Wall'. Another yellow line points to a small white circular opening, labeled 'Opening'. A third yellow line points to a black electronic component, labeled 'Drive Unit'.</p> </div>

Claim Language of the '418 Patent	Satisfyer Penguin Air Pulse Stimulator
	<div><p>Flexible Wall</p><p>Opening</p></div> <div><p>Use • Benutzung • Utilisation • Uso • Utilização • Utilizzo • Використання • Использование • 使用 • 使用</p><p>+Lube</p></div>

Claim Language of the '418 Patent	Satisfyer Penguin Air Pulse Stimulator
<p>a control device configured to receive input from the user and control the drive unit to cause the at least the portion of the flexible wall to deflect to create the modulated positive and negative pressures based on modulated frequencies;</p> <p>and</p>	<p>The Satisfyer Penguin Air Pulse Stimulator has a control device configured to receive input from the user and control the drive unit to create the at least the portion of the flexible wall to deflect to create the modulated positive and negative pressures based on modulated frequencies, as shown in the following annotated photographs:</p> <div>  <p>This photograph shows the internal components of the Satisfyer Penguin Air Pulse Stimulator. A yellow line points to the Drive Unit, which is a small motor assembly. Another yellow line points to the Control Device, which is a green printed circuit board (PCB) with various electronic components. The device is shown in a disassembled state, revealing the internal components and the flexible wall.</p> </div> <div>  <p>This photograph shows the internal components of the Satisfyer Penguin Air Pulse Stimulator from a different angle. A yellow line points to the Drive Unit, which is a small motor assembly. Another yellow line points to the Control Device, which is a green printed circuit board (PCB) with various electronic components. The device is shown in a disassembled state, revealing the internal components and the flexible wall.</p> </div>

Claim Language of the '418 Patent	Satisfyer Penguin Air Pulse Stimulator
	<p>Further, as described on Satisfyer's website (available at https://us.satisfyer.com/us/products/air-pulse-technology/air-pulse-stimulators/penguin/), the product has external buttons that interact with the control device such that the control device is configured to receive input from the user and control the drive unit to create the at least the portion of the flexible wall to deflect to create the modulated positive and negative pressures based on modulated frequencies:</p> <p style="text-align: center;">PRODUCT FEATURES</p>  <p>The graph below is further evidence that the control device controls the drive unit to create the at least the portion of the flexible wall to deflect to create the modulated positive and negative pressures based on modulated frequencies. As noted above, positive pressures are pressure measurements greater than 0 kPa and negative pressures are pressure measurements less than 0 kPa with respect to ambient pressure (represented by 0 kPa) measured by a differential pressure sensor.</p>

Claim Language of the '418 Patent	Satisfyer Penguin Air Pulse Stimulator
	<p>2021-08-04_Satisfyer Penguin Air Pulse Stimulator_Pressure vs. Time_Max. Intensity</p> 
a housing enclosing the drive unit and the control device.	<p>The Satisfyer Penguin Air Pulse Stimulator has a housing enclosing the drive unit and the control device, as shown in the following annotated copy of a photograph of the disassembled device:</p> 